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NAS WHITING FIELD
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REMEDIAL INVESTIGATION REPORT FOR SITE 16 OPEN DISPOSAL AND BURNING AREA

NAS WHITING FIELD FL

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HARDING LAWSON ASSOCIATES

ID 00248

REMEDIAL INVESTIGATION REPORT

SITE 16, OPEN DISPOSAL AND BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

Unit Identification Code: N60508

Contract No. N62467-89-D-0317/116

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January 2000

CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, Harding Lawson Associates, hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/116 are complete and accurate and comply with all requirements of this contract.

DATE: January 18, 2000

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(DFAR 252.227-7036)

FOREWORD

To meet its mission objectives, the U.S. Navy performs a variety of operations, some requiring the use, handling, storage, or disposal of hazardous materials. Through accidental spills and leaks and conventional methods of past disposal, hazardous materials may have entered the environment in ways unacceptable by today's standards. With growing knowledge of the long-term effects of hazardous materials on the environment, the Department of Defense initiated various programs to investigate and remediate conditions related to suspected past releases of hazardous materials at their facilities.

One of these programs is the Installation Restoration (IR) program. This program complies with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA), the Resource Conservation and Recovery Act and the Hazardous and Solid Waste Amendments of 1984. These acts establish the means to assess and clean up hazardous waste sites for both private sector and Federal facilities. The CERCLA and SARA form the basis for what is commonly known as the Superfund program.

Originally, the Navy's part of this program was called the Naval Assessment and Control of Installation Pollutants (NACIP) program. Early reports reflect the NACIP process and terminology. The Navy eventually adopted the program structure and terminology of the standard IR program.

The IR program is conducted in several stages as follow:

- preliminary assessment (PA),
- site inspection (SI) (formerly the PA and SI steps were called the initial assessment study under the NACIP program),
- remedial investigation and feasibility study, and
- remedial design and remedial action.

Southern Division, Naval Facilities Engineering Command implement the IR program while the U.S. Environmental Protection Agency and the Florida Department of Environmental Protection oversee the Navy environmental program at Naval Air Station (NAS) Whiting Field. All aspects of the program are conducted in compliance with State and Federal regulations, as ensured by the participation of these regulatory agencies.

Questions regarding the CERCLA program at NAS Whiting Field should be addressed to Ms. Linda Martin, Code 1859, at (803) 820-7341.

EXECUTIVE SUMMARY

A remedial investigation and feasibility study (RI/FS) is being conducted at Naval Air Station (NAS) Whiting Field in Milton, Florida, by Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) as part of the Department of Defense Installation Restoration (IR) program. The IR program was designed to identify and abate or control contaminant migration resulting from past operations at naval installations.

A phased approach was implemented to conduct the RI. Phase I was completed in May 1992. The subsequent phases of the RI were designated as Phase IIA and Phase IIB. Fieldwork for Phase IIA was completed in March 1994. Fieldwork for RI Phase IIB was completed in November 1996.

This RI report contains the results of assessment activities used to characterize site-specific chemicals detected in environmental media at Site 16, Open Disposal and Burning Area, at NAS Whiting Field. Data obtained from these activities were used to evaluate the nature and extent of contamination at the site and support feasibility studies (if required) and baseline risk assessments. Human health and ecological baseline risk assessments are included with the RI report.

The fieldwork conducted at Site 16 during the RI included the following tasks:

- geophysical survey,
- soil gas survey,
- surface soil sampling,
- test pitting,
- subsurface soil sampling,
- surface water sampling,
- monitoring well installation,
- groundwater sampling, and
- geologic and hydrogeologic investigations.

Soil, surface water, and groundwater samples were analyzed for target compound list (TCL) organic analytes and target analyte list (TAL) inorganic analytes. The following conclusions are based on the RI at Site 16, Open Disposal and Burning Area, at NAS Whiting Field:

- Geophysical survey results suggested the presence of two separate large areas of geophysical anomalies indicating general disposal areas rather than trenched fill areas. Smaller geophysical anomalies present east of the site are interpreted to represent random disposal areas rather than points of controlled fill.

- Ten test pits were excavated at the locations of geophysical anomalies at Site 16. Materials encountered during test pit excavations include construction debris, metallic debris, and aircraft parts.

- Methane and volatile organic compounds (VOCs) were detected during the soil gas survey conducted at Site 16. The highest soil gas concentrations (exceeding 5,000 parts per million [ppm] methane) were reported near the northeastern boundary of the southern landfill boundary.

- Two VOCs, 14 semivolatile organic compound (SVOCs), 6 pesticides, and 2 polychlorinated biphenyl (PCB) compounds were detected in 30 Site 16 surface soil samples. No VOCs detected in surface soils exceeded regulatory limits.

- The SVOCs, benzo(g,h,i)perylene and dibenzo(a,h)anthracene, exceeded the Region III risk-based concentration (RBCs). Two SVOCs, benzo(a)-pyrene and benzo(g,h,i)perylene, exceeded the industrial cleanup target levels for Florida. Benzo(a)pyrene and dibenzo(a,h)anthr-acene and exceeded the industrial soil cleanup target levels (SCTLs) for Region III RBCs. Benzo(a)pyrene and benzo(b)fluoranthene exceed the U.S. Environmental Protection Agency (USEPA) Region III RBCs and Florida residential cleanup goals for surface soil.

- Dieldrin was detected in two samples at concentrations exceeding the residential SCTL for Florida and for USEPA Region III RBC. No other pesticides or PCBs were detected at concentrations that exceeded either Florida or Federal SCTL.

- Twenty-three inorganic analytes and cyanide were detected in the 30 surface soil samples. Eighteen inorganic analytes exceeded the background screening values for surface soil. Beryllium, iron, and lead exceeded the Florida residential SCTLs. Arsenic and beryllium exceeded the residential values for the Florida SCTLs and the USEPA Region III RBCs. Arsenic also exceeded the USEPA Region III RBC and the Florida industrial SCTL.

- Seven VOCs, 11 SVOCs, and 4 pesticides compounds were detected in the five Site 16 subsurface soil samples. None of the detected concentrations of VOCs, SVOCs, or pesticides exceeded the USEPA Region III RBCs for industrial-use soils.

- Twenty inorganic analytes were detected in the five subsurface soil samples. Eight analytes (calcium, chromium, iron, manganese, potassium, vanadium, zinc, and cyanide) were detected at concentrations exceeding the background screening values. None of these inorganics exceeded industrial standards for either the Florida SCTLs or USEPA Region III RBCs.

- Arsenic was detected in all five subsurface soil samples at concentrations ranging from 1.5 to 15.1 milligrams per kilogram (mg/kg). Three of the five environmental samples and the duplicate sample exceeded the industrial SCTL for Florida (3.7 mg/kg) and the USEPA Region III RBC (3.8 mg/kg).

- Lead was detected in all five subsurface soil samples at concentrations ranging from 6.8 to 766 mg/kg. Lead concentrations exceeded the industrial values of the SCTLs for the USEPA Region III RBCs (400 mg/kg) in two samples.

- The pH values of the groundwater samples collected from monitoring wells were below the lower range for the Federal and State secondary maximum contaminate levels (MCLs) of 6.5 standard units but were within the range of pH values observed in background groundwater samples collected at NAS Whiting Field.

- No VOCs, SVOCs, pesticides or PCBs were detected in the surface water sample collected at Site 16. Eleven inorganic analytes were detected in the surface water sample, but only aluminum exceeded the Florida Class III fresh surface water values. Aluminum was detected at a concentration (758 micrograms per liter [$\mu g/\ell$]) exceeding the Florida groundwater guidance concentration of 200 $\mu g/\ell$.

- No VOCs were detected in the groundwater samples collected from the shallow monitoring wells at Site 16 nor were VOCs detected in background groundwater samples. One SVOC, bis(2-ethylhexyl)phthalate, was detected in groundwater samples collected from the shallow monitoring wells at concentrations below the Federal MCL and Florida groundwater guidance concentrations of 4.8 and 6 $\mu g/\ell$ for bis(2-ethylhexyl)phthalate. Bis(2-ethylhexyl)phthalate was not detected in background groundwater samples. One pesticide (4,4'-dichlorodiphenyltrichloroethane [DDT]) was detected in a shallow groundwater monitoring well at a concentration of 0.15 $\mu g/\ell$, which exceeds the Florida groundwater guidance concentration of 0.1 $\mu g/\ell$. No PCB compounds were detected in any shallow Phase IIB groundwater samples.

- Twenty inorganic analytes (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, zinc and cyanide) were detected in shallow groundwater samples collected from Site 16. Thirteen inorganic analytes (aluminum, barium, cadmium, calcium, copper, iron, magnesium, manganese, potassium, sodium, vanadium, zinc, and cyanide) were detected at concentrations exceeding the background screening concentrations. Six inorganic analytes (aluminum, antimony, beryllium, cadmium, iron, and manganese) were detected at concentrations exceeding either Federal or State regulatory limits.

- Eight VOCs (1,2-dichloroethane, 1,2-dichloroethene [total], benzene, chloroform, ethylbenzene, toluene, trichloroethene, and xylenes [total]) were detected in the groundwater samples collected from the intermediate monitoring wells at Site 16. 1,2-Dichloroethane, 1,2-dichloroethene, benzene, trichloroethene, and xylenes were detected at concentrations that either equaled or exceeded the Florida groundwater guidance concentrations.

- Three SVOCs (naphthalene, phenol, and bis(2-ethylhexyl)phthalate) were detected in the groundwater samples collected from the intermediate monitoring wells at Site 16. None of the detected SVOCs were found in background groundwater samples. Bis(2-ethylhexyl)phthalate was detected at a concentration equal to the Federal MCL of 6 $\mu g/\ell$ and exceeding the Florida groundwater guidance concentration of 4.8 $\mu g/\ell$ for bis(2-ethylhexyl)phthalate.

- One pesticide (4,4'-DDT), detected at a concentration of 0.14 μg/ℓ, exceeded the Florida groundwater guidance concentration of 0.1 μg/ℓ. No PCB compounds were detected in any Phase IIB intermediate depth groundwater samples.

- Fourteen inorganic analytes were detected in intermediate groundwater samples collected from Site 16. Seven inorganic analytes (barium, calcium, iron, magnesium, manganese, sodium, and zinc) were detected at concentrations exceeding the background screening concentrations. Four inorganic analytes (aluminum, antimony, iron, and manganese) were detected at concentrations exceeding either Federal or State regulatory limits.

- Five VOCs (1,2-dichloroethane, 1,2-dichloroethene [total], benzene, toluene, and trichloroethene) were detected in the groundwater samples collected from monitoring wells screened in the deeper level at Site 16. 1,2-Dichloroethane, 1,2-dichloroethene, benzene, and trichloroethene were detected at concentrations exceeding the Federal MCLs. 1,2-Dichloroethane and benzene were detected at concentrations exceeding the Florida groundwater guidance concentrations.

- Three SVOCs (naphthalene, phenol, and bis(2-ethylhexyl)phthalate) were detected in groundwater samples collected from monitoring wells screened in the deep surficial aquifer at Site 16. None of the detected SVOCs were found in background groundwater samples. Only bis(2-ethylhexyl)phthalate was detected at concentrations exceeding both the Federal MCL and the Florida groundwater guidance concentration.

- No pesticides or PCB compounds were detected in any groundwater samples collected from monitoring wells screened in the deeper level of the surficial water table.

- Fifteen inorganic analytes were detected in deep groundwater samples collected from Site 16. Seven inorganic analytes (aluminum, copper, iron, lead, manganese, potassium, and sodium) were detected at concentrations exceeding the background screening concentrations. Three inorganic analytes (aluminum, iron, and manganese) were detected at concentrations exceeding either Federal or State regulatory limits.

- The groundwater flow direction is toward the southwest and likely discharges to Clear Creek. Clear Creek is located approximately 400 feet west-southwest of the site. The average horizontal hydraulic gradient for the site is 0.0066 feet per foot. The geometric mean for the hydraulic conductivity data for monitoring wells in the site area is 22.2 feet per day (ft/day) and the average seepage velocity value is 0.38 ft/day.

- The human health risk assessment identified 8 PAHs (benzo(a)-anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene), 1 pesticide (dieldrin) and 10 inorganic analytes (aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, and vanadium) as human health chemical of potential concerns (HHCPCs) for surface soil at Site 16. Three inorganic analytes (arsenic, iron, and lead) were identified as HHCPCs for subsurface soil at Site 16. Five VOCs (1,2-dichloroethane, 1,2-dichloroethene [total], benzene, chloroform, trichloroethene), one SVOC (bis(2-ethylhexyl)phthalate), one pesticide (4,4'-DDT), and six inorganics (aluminum, arsenic, barium, cadmium, iron, and manganese) were identified as HHCPCs for groundwater in Site 16.

- The total excess lifetime cancer risk (ELCR) at Site 16, associated with ingestion of soil by a hypothetical future resident, current and hypothetical future trespasser, and hypothetical future occupational worker, exceeded Florida's target risk level of concern (1×10^{-6}) due primarily to carcinogenic PAHs and arsenic. The background levels of arsenic at Site 16 exceed the Florida residential SCTL and may result in an unacceptable carcinogenic risk. It is likely that naturally occurring arsenic contributes to the Florida Department of Environmental Protection (FDEP) target risk-level exceedance.

- Noncancer risk levels for soil, subsurface soil, and surface water meet the USEPA and FDEP target hazard index (HI) of one.

- The surface water ELCR for hypothetical future residents exceeds Florida's target level of concern due to beryllium. It should be noted, however, that this ELCR is based only on one sample.

- The ELCR for groundwater associated with residential ingestion and inhalation of volatiles while showering exceeded the Florida target level of concern due primarily to VOCs (primarily benzene) and arsenic; however, groundwater contamination is being addressed as a separate RI site under a facilitywide investigation.

- The central tendency risks from surface soil and surface water to a hypothetical current and future trespasser, and a hypothetical future occupational worker (soil only) met the Florida level of concern (1×10^{-6}) for Site 16. Central tendency residential risks remain slightly above the FDEP target levels. The hypothetical future residential groundwater risks (carcinogenic and noncarcinogenic) remain above the FDEP target risk levels, but provide the risk managers and decision makers with a perspective of the hypothetical risk range to future residents.

- The ecological risk assessment selection of ecological contaminant of potential concerns (ECPCs) for the surface soil samples collected at Site 16 include thirteen SVOCs (carbazole, bis(2-ethylhexyl)phthalate, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)-anthracene, fluoranthene, indeno (1,2,3-cd) pyrene, phenanthrene, and pyrene), one PCB (Aroclor-1254), one pesticide (dieldrin), and ten inorganic constituents (aluminum, barium, cadmium, copper, lead, manganese, mercury, silver, vanadium, and zinc).

- ECPCs selected for the surface water sample collected from the ephemeral wetland at Site 16 include seven inorganic analytes (aluminum, barium, beryllium, iron, lead, manganese, and zinc).

- Risks were identified for terrestrial wildlife resulting from exposure to ECPCs in surface soil; therefore, reductions in the survivability, growth, and reproduction of wildlife receptor populations at Site 16 may occur.

- ECPCs selected for the unfiltered groundwater samples collected at Site 16 include three VOCs (benzene, trichloroethene, and xylenes), one SVOC (bis(2-ethylhexyl)phthalate), one pesticide (4,4'-DDT), and ten inorganics (aluminum, barium, cobalt, copper, cyanide, iron, lead, manganese, vanadium, and zinc).

- Reduction in terrestrial plant and soil invertebrate biomass used as forage material was evaluated by comparing exposure concentrations for surface soil with toxicity benchmarks. Based on this comparison, it is unlikely that plant and invertebrate biomass or plant cover availability would be reduced such that small mammal and bird populations at Site 16 would be affected.

- Potential risks for aquatic receptors were evaluated for exposures to ECPCs in groundwater. The concentrations of ECPCs in groundwater as they discharge to Clear Creek 450 feet downgradient of Site 16 were estimated based on application of a 10-fold attenuation factor to the reasonable maximum exposure concentration. Based on the screening evaluation of groundwater, risks to aquatic receptors in Clear Creek associated with exposure to groundwater ECPCs from Site 16 are not expected. The ecological risk assessment (ERA) for Site 39 will provide additional information regarding potential risks for aquatic receptors in Clear Creek based on actual site-related surface water and sediment data.

- In summary, the results of the ERA suggest that only sublethal risks (i.e., reductions in growth and reproduction) to small mammal and bird and predatory bird populations are predicted. These risks are likely associated with ingestion of cadmium, lead, and zinc in surface soil and food items that have bioaccumulated these inorganic constituents.

Based upon the interpretation of findings from the RI activities, a feasibility study is recommended for Site 16 to evaluate potential strategies for the reduction in human health and ecological risks associated with surface soil at the site. In addition, the presence of organic and inorganic analytes in Site 16 groundwater samples at concentrations exceeding Florida's target risk levels indicates that additional sampling and remedial measures may be required. However, all groundwater contamination issues will be addressed as part of the RI for the facilitywide groundwater study to be completed in the future.

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
AQUIRE	Aquatic Information Retrieval
ARAR	applicable or relevant and appropriate requirement
ATSDR	Agency for Toxic Substances and Disease Registry
AVGAS	aviation gasoline
AWQC	ambient water quality criteria
BAF	bioaccumulation factor
BAT	Bengt-Arne-Torstensson
bls	below land surface
°C	degrees Celsius
CAR	Contamination Assessment Report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
cm/sec.	centimeters per second
CO_2	carbon dioxide
CPC	chemical of potential concern
CRDL	contract-required detection limit
CT	central tendency
DCA	dichloroethane
DDE	dichlorodiphenyldichloroethane
DDD	dichlorodiphenyldichloroethane
DDT	dichlorodiphenyltrichloroethane
DQO	data quality objective
ECPC	ecological contaminant of potential concern
ELCR	excess lifetime cancer risk
EM	electromagnetic
EPC	exposure point concentration
ERA	ecological risk assessment
FAC	Florida Administrative Code
FDEP	Federal Department of Environmental Protection
FS	Feasibility Study
ft/day	feet per day
ft^2/day	square feet per day
ft/ft	feet per foot
ft/yr	feet per year
GIR	general information report
g/mole	grams per mole
HASP	Health and Safety Plan
HEAST	Health Effects Assessment Summary Tables
HHCPC	human health chemical of potential concern

HHRA	human health risk assessment
HI	hazard index
HLA	Harding Lawson Associates
HQ	hazard quotient
HRS	Hazard Ranking System
IAS	initial assessment study
IDL	instrument detection limit
IRIS	Integrated Risk Information System
IR	installation restoration
LD_{50}	lethal dose to 50 percent of test population
LOAEL	lowest observed adverse effects level
MAG	magnetometer
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/kg-day	milligrams per kilogram per day
mg/ℓ	milligrams per liter
MS/MSD	matrix spike and matrix spike duplicate
μg/kg	micrograms per kilogram
μmho/cm	micromhos per centimeter
n	porosity
NACIP	Navy Assessment and Control of Installation Pollutants
NAS	Naval Air Station
NCP	National Oil and Hazardous Substances Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NOAEL	no observable adverse effects level
NPL	National Priority List
NTU	nephelometric turbidity unit
O_2	oxygen
OVA	organic vapor analyzer
%D	percent difference
PA	preliminary assessment
PAH	polynuclear aromatic hydrocarbon
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
PCPT	piezocone penetrometer test
PDE	potential dietary exposure
QA	quality assurance
QC	quality control
QAPP	Quality Assurance Program Plan
RBC	risk-based concentration
RGO	remedial goal option
RI	remedial investigation

RI/FS	remedial investigation and feasibility study
RME	reasonable maximum exposure
%RPD	relative percent difference
RRF	relative response factor
RTV	reference toxicity value
SARA	Superfund Amendments and Reauthorization Act
SCTL	soil cleanup target level
SDG	sample delivery group
SFF	site foraging frequency
SI	site inspection
SOUTHNAV-FACENGCOM	Southern Division, Naval Facilities Engineering Command
SQL	sample quantitation limit
SU	standard unit
SVOC	semivolatile organic compound
TAL	target analyte list
TCE	trichloroethene
TCL	target compound list
TM	trade mark
TRPH	total recoverable petroleum hydrocarbons
UCL	upper confidence limit
$\mu g/\ell$	micrograms per liter
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

Harding Lawson Associates (HLA), under contract to the Department of Navy, Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) is submitting the Remedial Investigation (RI) Report for Site 16, the Open Disposal and Burning Area at Naval Air Station (NAS) Whiting Field located in Milton, Florida. The RI Report for Site 16 is one in a series of site-specific reports that are being completed in conjunction with the NAS Whiting Field General Information Report (GIR) (HLA, 1998) to summarize the previous investigations and to present the results of the RI.

The Remedial Investigation and Feasibility Study (RI/FS) is being conducted on behalf of the Navy at Whiting Field under contract No. N62467-89-D-0317. The RI was conducted in three phases: the Phase I RI field program was completed in May 1992; the Phase IIA RI field program was conducted between May 1992 and March 1994; and the Phase IIB RI field program was completed in August 1997.

Installation Location and Description. NAS Whiting Field is located in Santa Rosa County, in Florida's northwest coastal area, approximately 7 miles north of Milton and 20 miles northeast of Pensacola (Figure 1-1). NAS Whiting Field presently consists of two air fields separated by an industrial area. The installation consists of approximately 2,560 acres. Figure 1-2 presents the installation layout and locations of RI/FS sites at NAS Whiting Field. A complete description of historic operations at the facility is presented in Section 1.3 and Appendix A of the NAS Whiting Field GIR (HLA, 1998).

1.1 PURPOSE OF THE RI/FS. The purpose of the NAS Whiting Field RI is to identify and characterize the nature and extent of chemicals in environmental media on site and to identify potential risks to human and ecological receptors that might be posed by toxic or hazardous chemicals present at Site 16. Chemicals were potentially released to the environment during past waste disposal practices or spills. The data collected during the RI field program may also be used in an FS to screen, evaluate, and select remedial alternatives to provide permanent, feasible solutions to environmental impacts that may be a result of past waste disposal practices or spills.

1.2 SITE DESCRIPTION AND BACKGROUND. The following is a physical description of Site 16 and a brief summary of past activities, as summarized in the Initial Assessment Study (IAS) conducted by Envirodyne Engineers, Inc. (May 1985).

Site 16 is located in the southwestern part of the facility, directly west of the South Air Field (Figure 1-2). The site is approximately 12 acres in size and is currently forested with planted pine trees (Figure 1-3). The land surface slopes gently to the west at an average grade of five percent. In the past, significant surface erosion occurred at several areas where no vegetation was present and no berms were installed to control erosion.

For over twenty years (1943-1965), this area served as the primary waste disposal area for the facility. There were two large pits into which general refuse plus waste from aircraft operation and maintenance were disposed. Aviation wastes included paints, solvents, waste oil, hydraulic fluid, and wastewater from paint

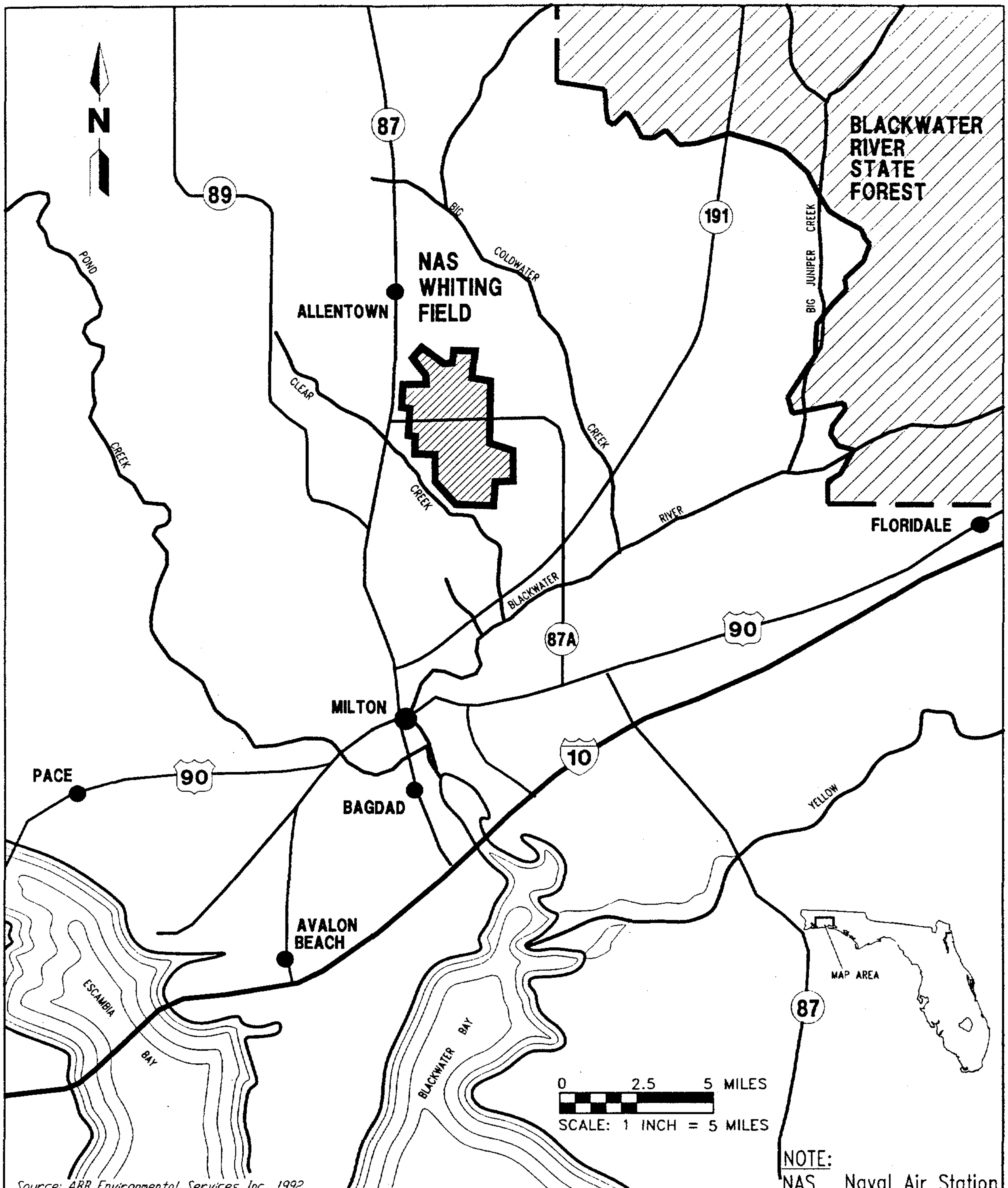

FIGURE 1-1
FACILITY LOCATION MAP

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL
AND BURNING AREA

NAS WHITING FIELD
MILTON, FLORIDA

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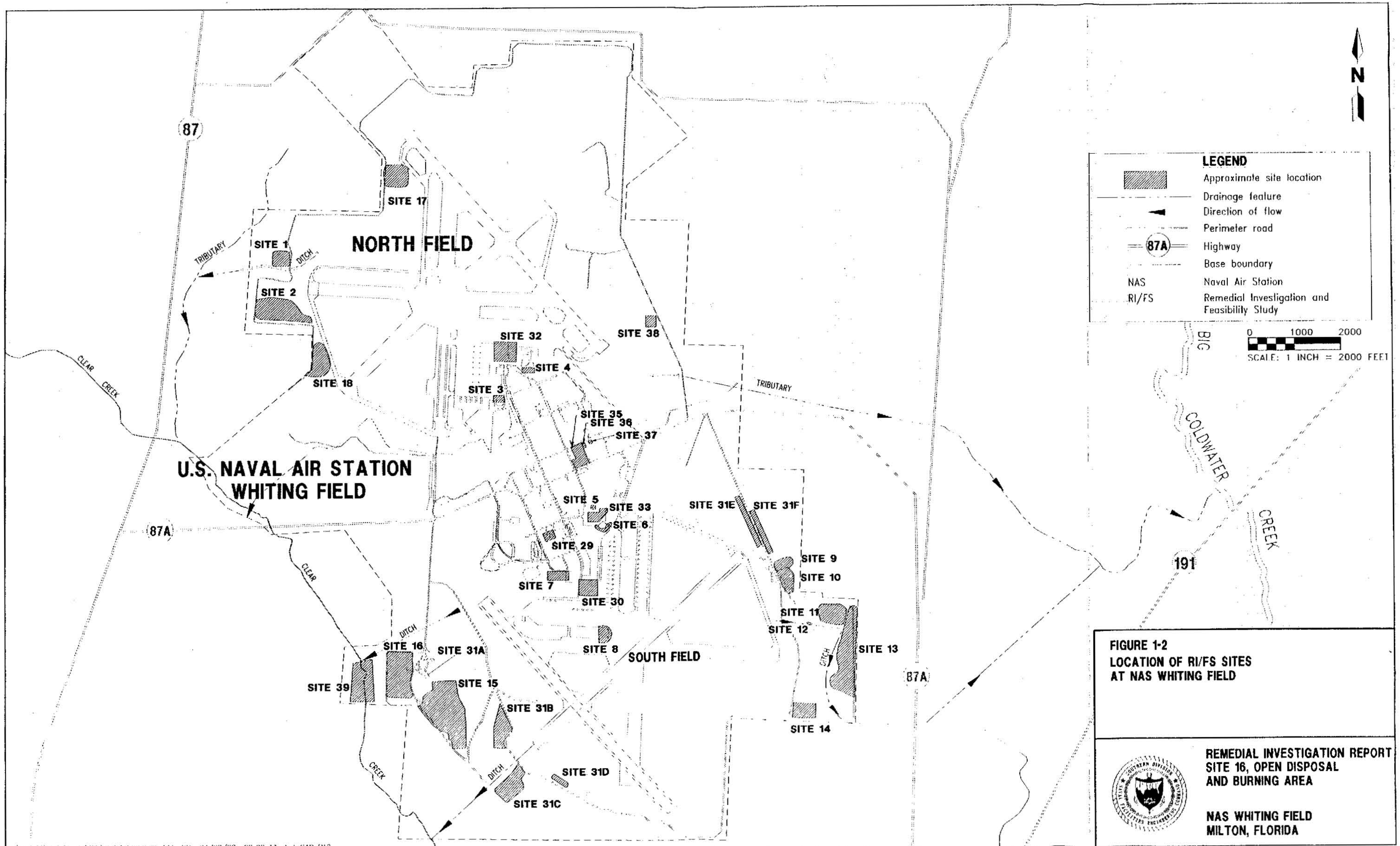

FIGURE 1-2
LOCATION OF RI/FS SITES AT NAS WHITING FIELD

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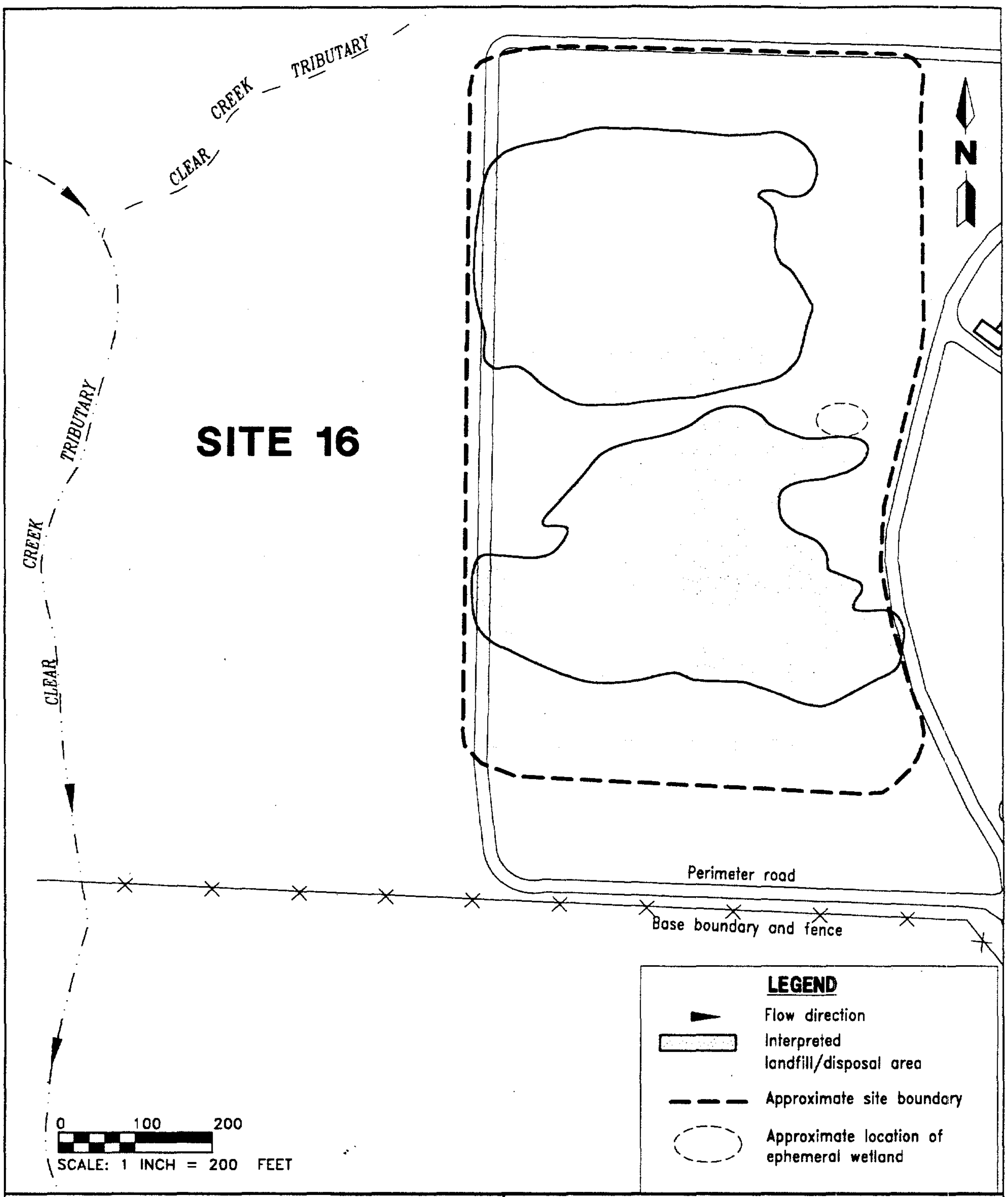

FIGURE 1-3
SITE 16, SITE PLAN MAP

REMEDIAL INVESTIGATION REPORT
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NAVAL AIR STATION WHITING FIELD
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K:\02534\02534-09\RIV\02534656.DWG, VC-BB 11/16/98 15:22:13, AutoCAD R14 stripping and other operations. Dielectric fluids containing polychlorinated biphenyls (PCBs) may also have been disposed of at the site. Estimated annual disposal volumes were 3,000 to 4,000 tons (Geraghty and Miller, 1986). To reduce volume, diesel fuel was used to ignite the waste.

According to the U.S. Department of Agriculture (USDA) (USDA, 1980), the soil at Site 16 is classified as Troup loamy sand, with some Lakeland sand. The Troup loamy sand type is characterized as a thick sandy surface layer overlying a loamy red subsoil to a depth of 40 to 80 inches below land surface (bls). Because the soil at the site is predominantly silty sand, storm water infiltrates directly into the soil.

The topography of Site 16 slopes toward Clear Creek, which is located 450 feet west of the site. Although overland transport of surface water runoff toward Clear Creek is possible, most of the on-site rainfall infiltrates directly into the ground due to erosion control measures and the porous nature of the sandy soil at Site 16.

A small (less than 0.1 acre) ephemeral wetland is located along the site's eastern boundary (Figure 1-3). Because much of the site was disturbed by the trench and fill operations, it is very likely that this wetland is the result of subsidence within an old trench. The ephemeral wetland area is shallow (less than 2 feet deep) and is recharged by storm water runoff, thus it remains dry for most of the year.

1.3 REGULATORY SETTING. The Navy Installation Restoration (IR) program was designed to identify and abate or control contaminant migration resulting from past operations at naval installations. The IR program is the Navy response authority under Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and Executive Order 12580. CERCLA requires that Federal facilities comply with the act, both procedurally and substantively. SOUTHNAVFACENGCOM is the agency responsible for the Navy IR program in the southeastern United States. Therefore, SOUTHNAVFACENGCOM has the responsibility to process NAS Whiting Field through preliminary assessment (PA), site inspection (SI), RI/FS, and remedial response selection in compliance with the guidelines of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] 300).

Section 105(a)(8)(A) of the SARA requires the U.S. Environmental Protection Agency (USEPA) to develop criteria to set priorities for remedial action for chemicals detected in environmental media based on relative risk to human health and the environment. To meet this requirement, USEPA has established the Hazard Ranking System (HRS) as Appendix A to the NCP. First promulgated in 1982, HRS was amended on March 14, 1991 (55 Federal Register No. 241:51532-51667), to comply with the requirements of Section 105(c)(1) of SARA to increase the accuracy of the assessment of relative risk. HRS (March 1991) has been substantially revised and is designed to prioritize sites after the SI phase of the CERCLA process.

The HRS score for NAS Whiting Field was generated in 1993. The score was sufficient to place NAS Whiting Field on the National Priority List (NPL).

In January 1994, the USEPA placed NAS Whiting Field on a proposed list of sites to be included on the NPL (40 CFR 300, Federal Register, January 18, 1994), and on May 31, 1994, NAS Whiting Field was placed on the NPL effective June 30, 1994 (40 CFR 300, Federal Register, May 31, 1994). As a result, the RI/FS for NAS Whiting Field must follow the requirements of the NCP, as amended by SARA, and regulatory guidance for conducting RI/FS programs under CERCLA.

<u>1.4 REPORT ORGANIZATION</u>. The RI Report includes ten chapters (Chapters 1.0 to 10.0) organized as follows. Chapter 1.0 presents the purpose, site description, and regulatory setting for the RI at NAS Whiting Field. Chapter 2.0 summarizes previous investigations. Chapter 3.0 presents the investigative methodology for conducting the assessment. Chapter 4.0 presents the site-specific data quality assessment. Chapter 5.0 presents the investigative results of the assessment. Chapter 6.0 presents the Human Health Risk Assessment and Chapter 7.0 presents the Ecological Risk Assessment. Chapter 8.0 presents the fate and transport of chemicals determined to be human and/or ecological chemicals of potential concern. Chapter 9.0 provides a summary of the conclusions and recommendations. Chapter 10.0 presents professional review certification.

2.0 PREVIOUS INVESTIGATIONS

This chapter summarizes the previous investigations at Site 16, Open Disposal and Burning Area at NAS Whiting Field.

2.1 INITIAL ASSESSMENT STUDY. Background information was gathered for the IAS (Envirodyne Engineers, Inc., 1985) by conducting a record search, performing an on-site survey, and conducting interviews with long-time employees and retired personnel familiar with the site. Interviews with facility personnel and record reviews indicated that prior to the 1970s most of the hazardous waste was reportedly disposed of in various pits on-base.

For over twenty years (1943-1965), this area served as the primary waste disposal area for the facility. There were two large pits into which general refuse plus aircraft operation and waste were disposed of. Aviation waste included paints, solvents, waste oil, hydraulic fluid, and wastewater from paint-stripping and other operations. Dielectric fluids containing PCBs may also have been disposed of at the site. Estimated annual disposal volumes were 3,000 to 4,000 tons (Envirodyne Engineers, Inc., 1985).

Envirodyne Engineers, Inc., recommended in the IAS that Site 16 warranted further investigation under the Navy's IR program to assess potential long-term impacts. A Confirmation Study was recommended in the IAS for Site 16, which included sampling and monitoring of environmental media to confirm the presence or absence of suspected contamination. The Confirmation Study would typically consist of two parts: verification and characterization; however, only the Verification Study was conducted.

2.2 VERIFICATION STUDY. The Verification Study (Geraghty & Miller, 1986) provided an assessment of the physical and chemical conditions existing at Site 16 as summarized below.

One monitoring well (WHF-16-1) was installed at Site 16 as part of the Verification Study. The monitoring well was installed to a depth of 42 ft bls at a location believed to be hydraulically downgradient of the waste pits (ABB Environmental Services, Inc. [ABB-ES], 1995d). The groundwater sample from monitoring well WHF-16-1 was submitted for analysis of USEPA Priority Pollutants and herbicides. The only Priority Pollutant compounds detected were bis(2-ethylhexyl)phthalate, lead, and zinc. Lead and zinc were both detected at concentrations below Florida primary drinking water standards (Chapter 17-22.104, Florida Administrative Code [FAC])in effect at the time of investigation (Geraghty and Miller, 1986).

The conclusion from the Verification Study indicated that a characterization study was needed to further investigate the nature and extent of contamination at Site 16; however, the IR program was modified in 1987-88 to be congruent with CERCLA and SARA regulatory requirements. As a result, the existing investigations (IAS, Verification Study) were used to support the updated program. Specifically, the IAS and Verification Study functioned as the PA/SI, and the characterization study was not performed.

3.0 FIELD INVESTIGATIVE METHODS

Field investigative methods to collect data during the RI are described in the RI/FS Work Plan, Volume II (E.C. Jordan, 1990), which provides descriptions of sampling methods, field personnel responsibilities, sample management, chain of custody, project documentation, change in field methods, protocols on corrective actions, decontamination procedures, waste management handling, and other general project standards and procedures in Section 3.1, General Site Operations of the Work Plan.

Field and laboratory quality assurance and quality control (QA/QC) requirements for the RI activities comply with the RI/FS Quality Assurance Project Plan (QAPP) located in Appendix A of the RI/FS Work Plan, Volume II (E.C. Jordan, 1990). Health and safety requirements were in accordance with the general Health and Safety Plan (HASP) located in Volume III of the RI/FS Work Plan (E.C. Jordan, 1990).

Field investigative methods not covered in the documents identified above are described in Technical Memorandum No. 7, RI Phase IIB Workplan (ABB-ES, 1995e) and in the NAS Whiting Field GIR (HLA, 1998).

These field and laboratory investigation techniques are in general conformance with USEPA standard operating procedures in effect at the time of the investigations (USEPA, 1991a and 1996a) and were followed during the RI sampling and analysis program.

The following sections provide a brief description of the field investigation and types of environmental samples collected and analyzed for an assessment of the surface soil, subsurface soil, surface water, groundwater, and hydrogeology at Site 16.

3.1 GEOPHYSICAL SURVEY. Geophysical surveys at Site 16 were conducted between May 26 and June 14, 1992. The purpose of the geophysical surveys was to assess the lateral and vertical extent of the waste disposal pits and locate buried metallic or nonmetallic objects that may indicate other potential waste disposal areas. The geophysical methods were also used to locate possible underground utility lines, fuel distribution lines, and other anthropogenic obstructions that need to be avoided with other intrusive subsurface exploration activities (i.e., test pits).

Geophysical methods used at the site include electromagnetic (EM) induction, direct current (DC) resistivity, using the Wenner array method, and magnetometry (MAG). Blackhawk Geosciences, Inc., Golden, Colorado, was subcontracted by ABB-ES to conduct the geophysical tasks. A technical report describing the methodology, results, and conclusions of the geophysical survey was prepared in February 1993 (ABB-ES, 1993). The following paragraph presents a brief description of the geophysical field program.

In an attempt to determine the depth of fill material in confirmed landfill sites, the DC method was used to measure resistivity. Results from this survey were inconclusive, and the method was not considered reliable for calculating depth of fill.

Data from the EM and MAG surveys at Site 16 were collected along north-south grid lines that were spaced 40 feet apart, with stations spaced every 10 feet along the lines. The grid lines were oriented with a magnetic compass and measuring tape. These grid lines were later surveyed by a Florida-licensed surveyor. The location of the grid and the plotted geophysical data are presented on Figures A-1 through A-4 in Appendix B (Geophysical Data). The results of the geophysical survey are presented in Section 5.3.

3.2 SOIL GAS SURVEY. A soil gas survey was conducted in June 1995 at Site 16 to assess the presence of methane gas or other VOCs potentially emanating from the site. Soil gas samples were collected across the site and up to 400 feet beyond the site boundary. Sample locations were determined based on a 100- by 100-foot grid spacing based on a random origin. The grid origin was located at an area that was assumed not to be influenced by soil gas emanating from the site. All grid lines were oriented in north-south and east-west directions. The grid area at Site 16 included the areal extent of the disposal areas based on previous geophysical survey interpretation. Figure 3-1 presents the locations of the active soil gas survey points.

At each location, an open-ended stainless-steel tube was pushed or manually driven to the proposed sampling depths of 1.5 feet and 3.0 feet bls. Organic vapor measurements were made at the two sampling depths. The air within the stainless-steel tube was purged with a vacuum pump to obtain a representative sample of soil gas. Total organic vapor concentrations were measured using a Portafid II™ or a Foxboro OVA-128™ organic vapor analyzer (OVA). Using a granulated carbon filter, methane gas concentrations were also recorded. A comparison of the two measurements allowed a quantitative analysis of the net presence of VOCs. Soil gas samples were not submitted for laboratory analysis.

A common problem associated with the use of the OVAs was probe flame-out due to either high humidity or high carbon dioxide (CO_2)/low oxygen (O_2) levels in the soil-gas samples. If an OVA flame-out occurred, a landfill gas analyzer (LFG-10™) was used to measure methane and CO_2 levels. The results of the soil gas survey are presented in Section 5.4.

3.3 GEOLOGIC ASSESSMENT. Several subsurface exploration techniques were used during Phase I and II investigations to evaluate and characterize the stratigraphy at Site 16 and investigate for the potential presence of a continuous confining clay layer at the site. Exploration techniques included monitoring well installation, piezocone penetrometer test (PCPT) soundings, and test pits.

Detailed lithologic descriptions for monitoring wells and PCPT soundings are presented in Phase I Technical Memorandum No. 1, Geologic Assessment (ABB-ES, 1992a) and in Phase IIA Technical Memorandum No. 2, Geologic Assessment (ABB-ES, 1995a). A summary of the geological assessment results is presented in Section 5.1 and the monitoring well boring logs and test pit logs for Site 16 are presented in Appendix C of this report.

3.4 HYDROGEOLOGIC ASSESSMENT. The hydrogeologic assessment of Site 16 (Open Disposal and Burning Area) included Site 15 (Southwest Landfill), an adjacent site, and utilized groundwater monitoring wells associated with Site 1466, an

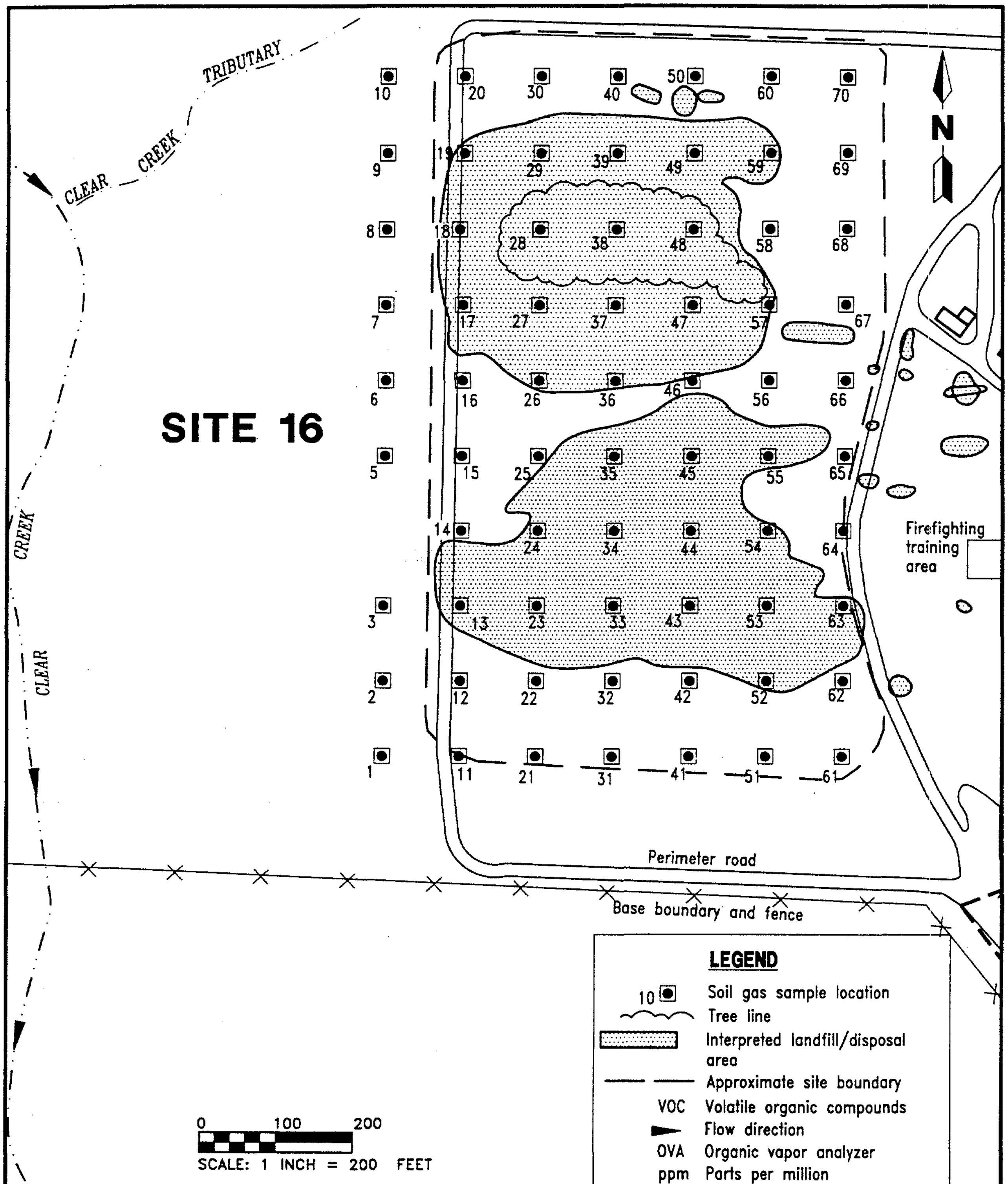

FIGURE 3-1
ACTIVE SOIL GAS SAMPLING LOCATIONS

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

K:\02534\02534-09\RIV\02534645.DWG, PDP-BB 01/06/99 10:54:33, AutoCAD R14 upgradient underground storage tank (UST) site. Sites 31A (Sludge Drying Beds) and 31B (Sludge Disposal Area) are also adjacent sites; however, no hydrologic data have been generated by investigations of these sites. Hydrogeologic data from Sites 15, 16, and 1466 were combined to provide a larger data set for a better understanding of the hydrogeologic conditions at the Open Disposal and Burning Area.

The hydrogeologic field investigation activities included collecting water-level data from 40 monitoring wells (Figure 3-2) and conducting slug test analyses on 6 monitoring wells. Results of the Phase IIA hydrological assessment are presented in Phase IIA Technical Memorandum No. 4, Hydrogeologic Assessment (ABB-ES, 1995c). Monitoring well construction details for these sites are presented in Table 3-1. Results of the hydrogeologic assessment are presented in Section 5.2 of this report.

<u>3.5 SURFACE SOIL ASSESSMENT</u>. Characterization of surface soil (land surface to 1.0 foot bls) was required to support the ecological risk assessment and human health risk assessment (exposure of transient persons to site soil). Soil samples from previous studies were biased based on visual and geophysical anomalies. As a result, soil samples from random locations were warranted to confirm the presence or absence of contamination, and characterize the nature and extent of contamination.

For Site 16, the surface soil assessment included the collection of three surface soil samples during Phase IIA and 17 surface soil samples during Phase IIB. The locations of the surface soil samples collected during Phase IIA and IIB are shown on Figure 3-3. Results of the surface soil assessment are presented in Section 5.5 of this report.

The surface soil samples were collected from the land surface to a maximum depth of 12 inches bls using a decontaminated stainless-steel auger. Soil samples were described using the Unified Soil Classification System and recorded in a bound field logbook by HLA personnel.

The surface soil samples at Site 16 were analyzed for TCL VOCs, SVOCs, pesticides and PCBs, and TAL inorganics.

Background screening criteria were established by collecting background samples across the installation from each USDA soil type identified at NAS Whiting Field. These data are presented in Subsection 3.3.1 of the GIR (HLA, 1998). The arithmetic mean of analytes detected in the background soil samples was calculated by adding individual analyte concentrations and then dividing the sum by the number of samples from which the analytes were detected. Surface soil sample analytical results were compared to twice the arithmetic mean of analyte concentrations detected in background surface soil samples associated with the Troup loamy sand and Lakeland sand soil types also present at Site 16. A statistical summary for the combined surface soil type background data and the surface soil sampling results are discussed in Section 5.5 of this report. Soil sample analytical data are presented in Appendix D of this report.

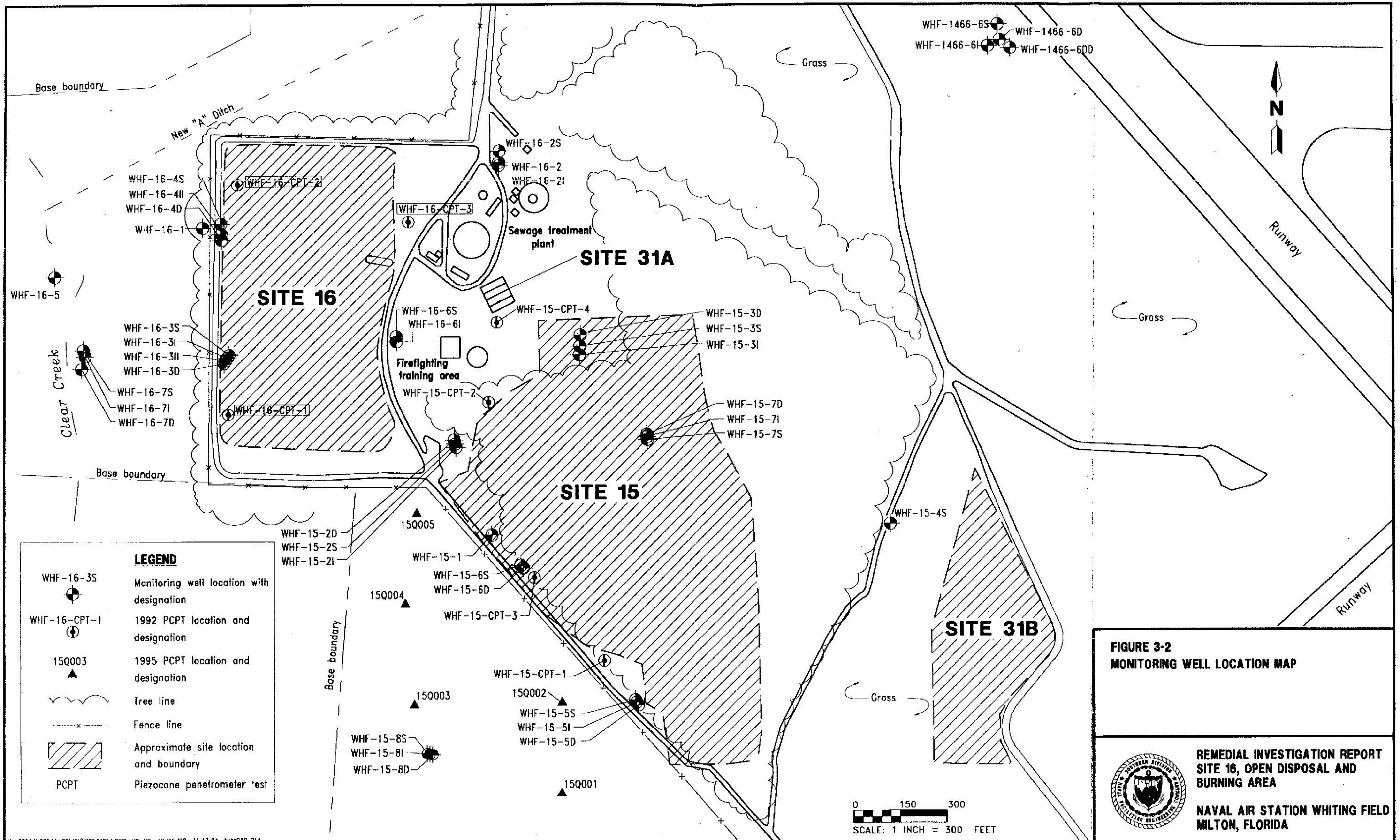

FIGURE 3-2
MONITORING WELL LOCATION MAP

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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Table 3-1
Summary of Monitoring Well Construction Details

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	RI Phase of Well Completion	Well Diameter (inches)	Land Surface Elevation (feet msl)	TOC Elevation (feet msl)	Total Well Depth (feet BTOC)	Approximate Screened Interval (feet BTOC)
Southwest Landfill and Adjacent Areas						
Site 15, Southwest Landfill						
WHF-15-1	VS	4	64.17	66.35	73.60	63 to 73
WHF-15-2S	IIA	2	57.18	59.58	32.90	17 to 32
WHF-15-2I	IIA	2	57.24	60.10	63.20	53 to 63
WHF-15-2D	IIA	2	57.05	59.39	112.44	107 to 112
WHF-15-3S	IIA	2	67.35	69.29	37.94	22 to 37
WHF-15-3I	IIA	2	67.26	69.69	87.83	77 to 87
WHF-15-3D	IIA	2	67.84	69.44	119.48	109 to 119
WHF-15-4S	IIA	2	140.62	143.29	109.15	94 to 109
WHF-15-5S	IIA	2	101.73	104.14	68.18	58 to 68
WHF-15-5I	IIA	2	102.05	105.17	98	85 to 98
WHF-15-5D	IIA	2	102.81	106.11	128.38	115 to 125
WHF-15-6S	IIA	2	71.87	74.29	43.73	28 to 43
WHF-15-6D	IIA	2	72.56	75.08	123.36	113 to 123
WHF-15-7S	IIB	2	116.96	120.18	88.85	71 to 88
WHF-15-7I	IIB	2	116.59	119.85	121.5	105 to 121
WHF-15-7D	IIB	2	116.36	119.49	147.53	135.5 to 145.5
WHF-15-8S	IIB	2	77.03	79.67	55	38 to 55
WHF-15-8I	IIB	2	76.69	79.48	85.2	73 to 85
WHF-15-8D	IIB	2	76.19	79.08	115	103 to 115
Site 16, Open Disposal Burning Area						
WHF-16-1	VS	4	47.47	50.04	43.00	33 to 43
WHF-16-2	I	4	79.38	82.19	74.20	69 to 74
WHF-16-2S	IIA	2	80.77	83.66	49.80	34 to 49
WHF-16-2I	IIA	2	78.02	80.60	130.14	120 to 130
WHF-16-3S	IIA	2	48.60	51.69	23.25	8 to 23
WHF-16-3I	IIA	2	48.73	51.31	52.87	47 to 52
WHF-16-3II	IIA	2	48.60	51.22	78.91	73 to 78
WHF-16-3D	IIA	2	48.64	51.40	118.08	108 to 118
WHF-16-4S	IIA	2	52.19	54.79	22.38	7 to 22
WHF-16-4II	IIA	2	50.62	53.01	64.80	54 to 64
WHF-16-4D	IIA	2	49.88	52.87	122.54	112 to 122
WHF-16-5	IIA	2	--	37.54	13.50	3 to 13
WHF-16-6S	IIB	2	53.67	56.57	26	10 to 25

See notes at end of table.

Table 3-1 (Continued)
Summary of Monitoring Well Construction Details

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	RI Phase of Well Completion	Well Diameter (inches)	Land Surface Elevation (feet msl)	TOC Elevation (feet msl)	Total Well Depth (feet BTOC)	Approximate Screened Interval (feet BTOC)
Site 16, Open Disposal Burning Area **(Continued)**						
WHF-16-6I	IIB	2	NA	56.77	60	50 to 60
WHF-16-6D	IIB	2	53.58	56.77	62.1	50 to 62
WHF-16-7S	IIB	2	35.05	38.27	14	3 to 14
WHF-16-7I	IIB	2	35.14	38.17	46.5	33 to 46
WHF-16-7D	IIB	2	35.19	38.05	75.2	63 to 75
Site 1466						
WHF-1466-6S	UST	2	173.40	173.09	131	120 to 131
WHF-1466-6I	UST	2	173.01	173.06	160	150 to 160
WHF-1466-6D	UST	2	173.21	173.05	190.5	180 to 190
WHF-1466-6DD	UST	2	172.86	172.90	220	208 to 220

Notes: RI = remedial investigation.
msl = mean sea level.
TOC = top of casing.
BTOC = below top of casing.
VS = Verification Study.
IIA = Remedial Investigation Phase IIA.
IIB = Remedial Investigation Phase IIB.
-- = not available.
UST = underground storage tank.
I = Remedial Investigation Phase I.

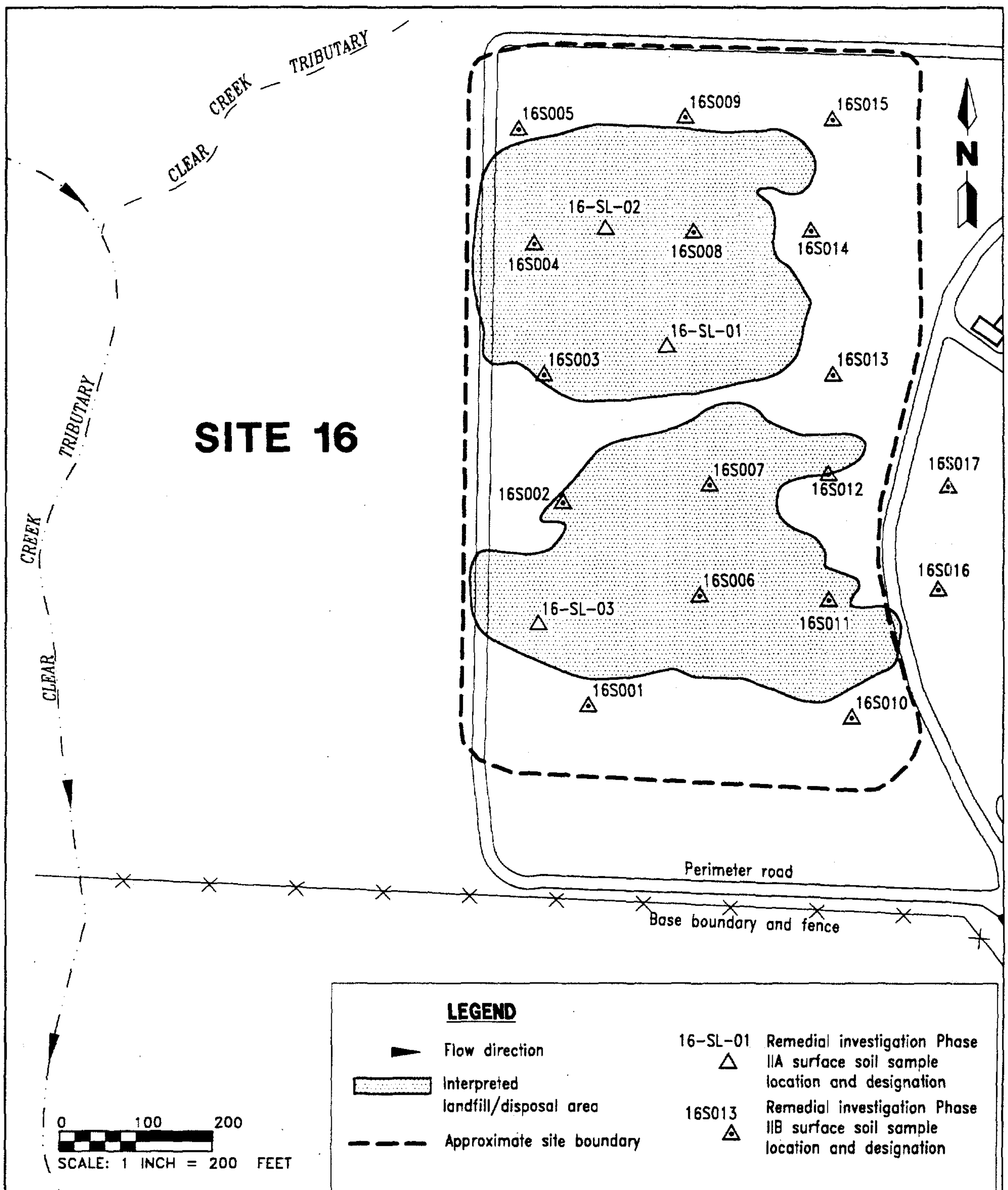

FIGURE 3-3
SURFACE SOIL SAMPLE LOCATIONS

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REMEDIAL INVESTIGATION REPORT
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MILTON, FLORIDA

3.6 SUBSURFACE SOIL ASSESSMENT. The RI subsurface investigation at Site 16 included a PCPT investigation, split-spoon sampling conducted during monitoring well installation, test pit excavation, and subsurface soil sampling.

Subsurface soil samples were compared to USEPA Region III Risk-Based Concentrations (RBCs), Florida Soil Cleanup Target Levels (SCTLs), and background subsurface soil data for NAS Whiting Field, which is presented in Subsection 3.3.1 of the GIR (HLA, 1998). Table 3-18 in the GIR presents a statistical summary of the background subsurface soil data at NAS Whiting Field.

The locations of the subsurface soil samples collected from the test pits at Site 16 are shown on Figure 3-4. Results of the subsurface soil assessment are presented in Section 5.6 of this report.

Five subsurface soil samples were collected from five different test pits at Site 16. Sample 16SS0201 was collected from TP-16-02 from 2 to 3.5 feet bls. Sample 16SS0302 was collected from TP-16-03 from 6 to 8 feet bls. Sample 16SS0403 and duplicate sample 16SS0403A were collected from TP-16-04 from 9 to 10 feet bls. Sample 16-SS-06-04 was collected from TP-16-06 from 10.5 feet bls. Sample 16-SS-10-05 was collected from TP-16-10 from 2 feet bls. The locations of the test pits are presented on Figure 3-4. Each soil sample was analyzed for TCL VOCs, SVOCs, pesticides, PCBs, TAL metals, and cyanide.

3.6.1 PCPT Investigations Three PCPT explorations were performed at Site 16 (WHF-16-CPT-1, WHF-16-CPT-2, and WHF-16-CPT-3) during Phase I of the RI (ABB-ES, 1992a); four additional PCPT explorations were performed (16Q001, 16Q002, 16Q003, 16Q007) in 1995. The location of the PCPT exploration is shown on Figure 3-2.

The PCPT exploration consisted of a stainless-steel cone tip (equipped with electronic sensors) connected to stainless-steel rods that were hydraulically driven into the overburden soils. Measurements of end-bearing resistance, friction resistance, and pore pressure were recorded from the sensors throughout the sounding. The analog signals from the cone tip sensors were digitized for data logging and analyses of the digital data was completed in the field using a data acquisition software system. Based on the cone readings, a lithologic description of the soil was computed with the aid of the software package.

The cone tip was advanced until the friction resistance of the overburden soils exceeded the power of the hydraulic system (i.e., refusal). At that point, the exploration was terminated. The primary purpose of extending the PCPT probe was to collect *in situ* groundwater samples using the Bengt-Arne-Torstenssen (BAT) screening technique. The BAT *in situ* groundwater sampling technique is described in Phase IIA Technical Memorandum No. 5, Groundwater Assessment (ABB-ES, 1995d). A summary of the sounding designations, completion dates, proposed and actual depths, and the lithologic descriptions for the soundings is presented in Phase IIA Technical Memorandum No. 2, Geologic Assessment (ABB-ES, 1995a).

3.6.2 Split Spoon Sampling Lithologic data were also obtained by collecting subsurface soil samples at monitoring well locations (see Figure 3-2). A 2-foot split-spoon sample was collected for visual inspection by an HLA geologist and all pertinent data were entered into a bound logbook. Detailed soil descriptions and other pertinent data are presented in the boring logs for the soil boring investigation, located in Phase IIA Technical Memorandum No. 2, Geologic Assessment (ABB-ES, 1995a) and in Section 5.1 of this report. Split-spoon

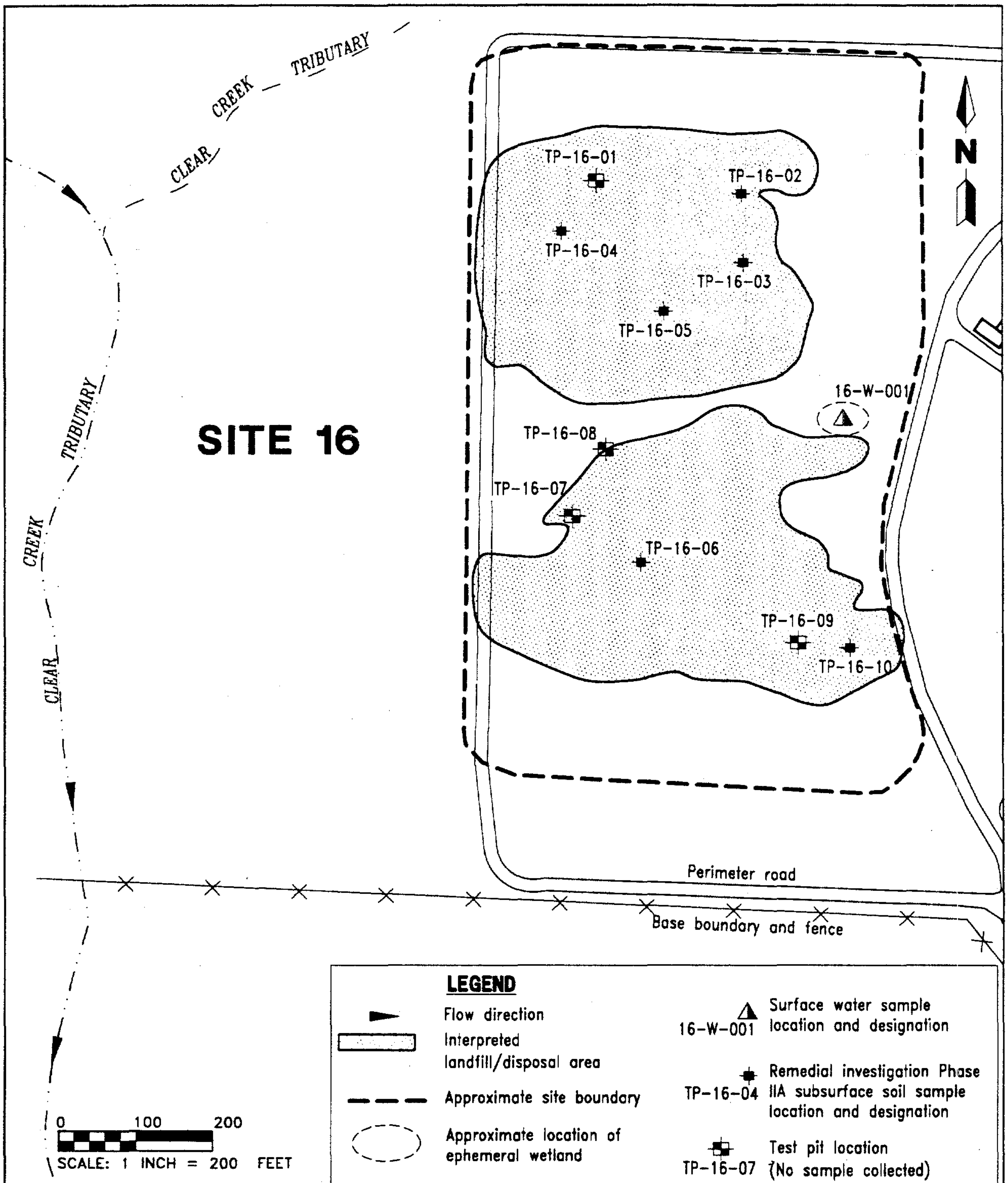

FIGURE 3-4
SUBSURFACE SOIL TEST PIT, AND SURFACE WATER SAMPLE LOCATIONS

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MILTON, FLORIDA

samples were generally collected at 5-foot intervals during drilling of the monitoring wells. Monitoring well installations were conducted in conjunction with the hydrogeologic and groundwater investigations, which are summarized in Phase IIA Technical Memoranda 4 and 5, respectively (ABB-ES, 1995c and 1995d).

<u>3.6.3 Test Pitting</u> Ten test pits were excavated at Site 16 in October 1992, following the completion of the geophysical survey. UXB International, Inc., (Chantilly, Virginia) was subcontracted by HLA to conduct the test pit excavations.

The ten test pits were excavated at those locations (Figure 3-4) where geophysical anomalies potentially defined buried materials. The purpose of the test pits was to characterize waste materials (if present) by providing a description of the waste and collection and chemical analysis of a subsurface soil sample. The analytical data were used to characterize the nature of soil contamination within the test pits.

Prior to excavating the test pits at Site 16, the proposed areal dimensions and orientation of the test pits were surveyed by UXB with a hand-held magnetometer, a terrain conductivity meter (FEREX™ 4.021), and a metal detector. Site-specific field activities also included clearing of vegetation when necessary.

After the test pit location and orientation had been determined, the four corners of the test pit were staked. The staked locations were referenced to the grid coordinates defined for the geophysical survey. A backhoe was used to excavate a rectangular pit. The physical description of each soil layer and waste type was recorded in the field logbook during test pit excavation. A subsurface soil sample was collected directly from the backhoe bucket during the excavation. The depth of the subsurface soil samples ranged from 2 feet bls to 10.5 feet bls at Site 16 test pits. Following sample collection, the test pit was backfilled with excavated soil using the backhoe.

<u>3.7 SURFACE WATER ASSESSMENT</u>. Surface water assessment activities included collecting a surface water sample (16W00101) during Phase IIB from the ephemeral wetland at Site 16. The ephemeral wetland occurs during heavy rain periods and is shown on Figure 3-3. The surface water sampling at Site 16 was conducted to assess the nature of surface water contamination from storm water runoff or contaminated surface soil (if present). A summary of the analytes detected in surface water is discussed in Section 5.7 of this report. Surface water analytical data are presented in Appendix E of this report.

<u>3.8 GROUNDWATER ASSESSMENT</u>. Groundwater assessment activities included collecting groundwater samples with a BAT sampler during Phase I and collecting groundwater samples from monitoring wells installed in Phase IIA and IIB. Groundwater sampling was conducted at Site 16 to assess the lateral and vertical extent of potential groundwater contamination. The locations of the monitoring wells and BAT samples are shown in Figure 3-2.

The RI Phase I investigation at Site 16 included the collection of four groundwater samples using a PCPT and BAT sampler at three locations and installation of one monitoring well (WHF-16-2). The PCPT and monitoring well locations are shown on Figure 3-2. Groundwater samples were collected from the

BAT sampling locations at depths ranging from 28 to 100 feet bls. Monitoring well WHF-16-2 was not sampled as part of the Phase I investigation. The four BAT samples were analyzed for volatile organic compound (VOCs) and target analyte list (TAL) inorganic analytes at an off-site laboratory.

During the Phase IIA investigation, ten new monitoring wells were installed and groundwater samples were collected from the new wells and the existing wells (Figure 3-2). Samples were analyzed for target compound list (TCL) VOCs, semivolatile organic compound (SVOCs), pesticides and PCBs, and TAL inorganic analytes. A summary of the analytical results is provided in Section 5.8 of this report.

The Phase IIA groundwater samples were collected from the monitoring wells using a Teflon™ bailer after purging the monitoring wells with a submersible or bladder pump. Purging and sampling methodology was followed as presented in Paragraph 2.1.7.2 of the GIR (HLA, 1998). The groundwater samples were analyzed for CLP (Naval Energy and Environmental Support Activity [NEESA] Level C) TCL VOCs, SVOCs, pesticides, PCBs, and TAL inorganics.

During Phase IIB of the RI, the seventeen existing monitoring wells at Site 16 were sampled using low-flow sampling techniques. Purging and sampling methodology was followed as presented in Paragraph 2.1.7.2 of the GIR (HLA, 1998). The groundwater samples were analyzed for CLP (NEESA Level D) TCL VOCs, SVOCs, pesticides, PCBs, and TAL inorganics. Samples for TAL inorganics were unfiltered (total analysis) if turbidity was below 10 nephelometric turbidity units (NTUs). If turbidity was greater than 10 NTUs, an additional groundwater sample was collected and filtered (dissolved-phase inorganics) using a 45-micron filter. The purpose of the additional groundwater sample was to assess uncertainty associated with a turbid unfiltered groundwater sample.

All Site 16 monitoring wells were sampled during August 1996. Five Site 16 monitoring wells were resampled for VOCs during November 1996. Fifteen Site 16 monitoring wells were resampled for either VOCs or TAL inorganics during July 1997.

Analyses were also conducted to assess secondary water quality parameters and provide data for assessing remedial alternatives in the FS. The analyses included alkalinity, chloride, sulfates, color, hardness, ammonia nitrates, total Kjeldahl nitrogen, nitrate and nitrite, Ph, phosphorous, total dissolved solids, and sulfides.

A summary of the analytes detected in groundwater during these sampling events is discussed in Section 5.8 and the groundwater analytical data is presented in Appendix F of this report.

4.0 SITE SPECIFIC DATA QUALITY ASSESSMENT

This chapter describes how the data generated during Phase IIB of the RI at Site 16 were managed and evaluated. Section 4.1 describes the analytical program and data management for the RI at Site 16. Section 4.2 summarizes the precision, accuracy, representativeness, comparability, and completeness (PARCC) report on the data. Section 4.3 presents a summary of the Data Quality Assessment.

The soil and groundwater samples collected during Phase IIA of the RI were qualified according to USEPA functional guidelines for evaluation of organic (USEPA, 1991b) and inorganic (USEPA, 1988a) analytical data analyzed using USEPA CLP protocol. The Data Quality Objective (DQO) assessment for the Phase IIA soil samples is presented in detail in the *RI/FS Phase IIA Technical Memorandum No. 3* (ABB-ES, 1995b). The DQO assessment for the Phase IIA groundwater samples is presented in detail in the *RI/FS Phase IIA Technical Memorandum No. 5* (ABB-ES, 1995d).

4.1 ANALYTICAL PROGRAM. Environmental and quality control samples collected during the Phase IIB of the RI at Site 16 were analyzed using field screening methods and laboratory analytical methods. Site 16 analytical results and quality control data are included with sample delivery groups (SDGs) WF008, WF11A, WF013, WF014, WF023, WF026, WF027, WF031B, WF037, and WF051. The field QC data are presented in Appendix A of this report. Sampling locations are presented in Chapter 3.0 and sample results are presented in Chapter 5.0 of this report. The analytical data are presented in Appendices D, E, and F, which are soil, surface water, and groundwater, respectively.

Environmental samples (surface soil, subsurface soil, surface water, and groundwater) were collected and analyzed at an off-site laboratory using SW-846 methodology (USEPA, 1986a) for analysis of VOCs, SVOCs, pesticides, PCBs, total recoverable petroleum hydrocarbons (TRPH), metals, and cyanide. The laboratory analytical program is described in more detail in Section 2.2 of the NAS Whiting Field GIR (HLA, 1998).

Analytical results obtained for all environmental samples during the RI sampling events were submitted as NEESA Level D (USEPA Level IV) analytical packages for VOCs, SVOCs, pesticides, PCBs, TRPH, metals, cyanide, and wet chemistry.

4.2 DATA REVIEW. Data validation is the technical review of individual analytical results relative to the following criteria:

- DQOs and the QAPP in the NAS Whiting Field Work Plan (E. C. Jordan Co., Inc., 1990 and ABB-ES, 1995e).
- NEESA guidance document 20.2-047B, Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program (NEESA, 1988).
- USEPA, Contract Laboratory Program National Functional Guidelines for Organic Data Review, February 1994 (USEPA, 1994a).

- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, February 1994 (USEPA, 1994b).

The data validation process is described in Section 2.3 of the NAS Whiting Field GIR (HLA, 1998).

The data were reviewed, validated, and evaluated using the PARCC criteria specified in the DQOs. PARCC criteria are described in Section 2.3 of the NAS Whiting Field GIR (HLA, 1998). The Site 16 Phase IIB soil, surface water, and groundwater analytical data were validated by Laboratory Data Consultants, Inc. (LDC), of Carlsbad, California in 1996-97. The subsections below summarize the PARCC criteria evaluation of the analytical data.

<u>4.2.1 **Precision**</u> Precision is a measure of the agreement or repeatability of a set of replicate results (relative percent difference [RPD]) obtained from duplicate laboratory analyses of samples collected from the same location and depth interval. Precision for analytical data collected during the RI sampling events was evaluated using results of field duplicate samples, laboratory duplicate samples, matrix spike and matrix spike duplicate (MS/MSD) samples, and/or consecutive laboratory control samples. The evaluation of precision for the field duplicate samples at Site 16 is presented in Table 4-1 and summarized below.

<u>Organic Analytes</u>. The RPD criteria for eight organic compounds (acetone, 1-2-dichloroethene, naphthalene, dieldrin, 4,4'-dichlorodiphenyldichloroethene [DDE], alpha-chlordane, gamma-chlordane, and Aroclor-1260) did not meet the control limit for at least one SDG as shown in Table 4-1. All other organic analytes were within the control limit for RPD. Since acetone is widely recognized as a laboratory contaminant, the acetone spike in the sample and duplicate may not have been introduced in the field. Furthermore, the high imprecision of acetone (as high as 111 percent RPD) may be the result of poor laboratory instrument stability rather than improper sample collection and handling.

<u>Inorganic Analytes</u>. The RPD criteria for nine inorganic analytes (aluminum, chromium, copper, iron, lead, magnesium, potassium, zinc, and cyanide) in at least one SDG did not meet the control limit (Table 4-1). According to the data validation (LDC, 1996-97), the exceedences in the inorganic analytes are considered moderately imprecise. Exceedances of RPD values may have been due to sample heterogeneity or poor laboratory instrument stability.

<u>4.2.2 **Accuracy**</u> Accuracy is a measure of the agreement between the true value and the value measured using an analytical method (percent recovery). Accuracy also is evaluated during data validation by assessing initial and continuing calibration data for the analytical instrument. Accuracy for analytical data collected during the RI sampling events was assessed by evaluating percentage recoveries for MS/MSD samples, surrogate recoveries, laboratory control samples, and initial and continuing calibration standard results. A summary of accuracy exceedences for MS/MSD samples at Site 16 is presented in Table 4-2 and summarized below.

The percent recovery for some of the MS/MSD samples was above or below the target range; therefore, some analytical results may be biased high or low. Some of the analytical results for SVOCs and inorganic analytes were qualified based on the evaluation of percent recovery. According to the data validation (LDC, 1996-97),

Table 4-1
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SDG Number	Sample ID	Compound	Sample Concentration (D_1)	Duplicate Concentration (D_2)	RPD (%)	Control Limit (%)
Soil						
WF013						
Organics (μg/kg)	16S00101	Acetone	4	9	77	50
		bis(2-Ethylhexyl)phthalate	45	ND	NC	50
		4,4'-DDE	3.2	2.0	46	50
		4,4'-DDT	3.8	2.7	34	50
Organics (μg/kg)	16S01001	Acetone	14	4	111	50
		bis(2-Ethylhexyl)phthalate	60	58	3	50
		Dieldrin	33	60	58	50
		4,4'-DDE	13	22	51	50
		4,4'-DDT	6.4	9.0	34	50
		Alpha-chlordane	6.8	12	55	50
		Gamma-chlordane	4.0	7.9	66	50
		Aroclor-1260	48	110	78	50
TAL Metals (mg/kg)	16S00101	Aluminum	4,250	5,480	25	30
		Arsenic	0.94	1.2	24	30
		Barium	13.2	13.6	3	30
		Beryllium	0.09	ND	NC	30
		Cadmium	0.28	0.30	7	30
		Calcium	210	173	19	30
		Chromium	4.0	5.8	37	30
		Copper	4.8	3.0	46	30
		Iron	2,340	2,910	22	30
		Lead	7.8	7.5	4	30
		Magnesium	103	150	37	30
		Manganese	185	151	20	30
		Nickel	ND	1.9	NC	30
		Potassium	99.6	141	34	30
		Selenium	0.19	ND	NC	30
		Sodium	129	108	18	30
		Vanadium	6.8	8.6	23	30
		Zinc	6.4	6.9	8	30
		Cyanide	0.12	0.12	0	30

See notes at end of table.

Table 4-1 (Continued)
Precision Summary for Soil and Groundwater Field Duplicate Samples

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SDG Number	Sample ID	Compound	Sample Concentration (D_1)	Duplicate Concentration (D_2)	RPD (%)	Control Limit (%)
Soil						
WF013						
<u>TAL Metals</u> (mg/kg)	16S01001	Aluminum	2,000	1,780	12	30
		Arsenic	0.76	0.64	17	30
		Barium	4.9	4.0	20	30
		Cadmium	ND	0.23	NC	30
		Calcium	101	99.8	1	30
		Chromium	3.9	3.3	16	30
		Copper	10.2	8.6	17	30
		Iron	1,470	1,310	12	30
		Lead	13.5	12.4	9	30
		Magnesium	38.5	29.9	25	30
		Manganese	5.6	4.9	13	30
		Mercury	0.20	0.17	16	30
		Potassium	ND	77.6	NC	30
		Selenium	0.13	ND	NC	30
		Silver	4.1	3.6	13	30
		Sodium	139	118	16	30
		Vanadium	3.4	3.2	6	30
		Zinc	4.1	3.4	19	30
		Cyanide	0.10	0.17	52	30
Surface Water						
WF11A						
<u>Organics</u> (μg/kg)	09W00101	Toluene	ND	1	NC	50
<u>TAL Metals</u> (mg/kg)	09W00101	Aluminum	123	129	5	30
		Arsenic	0.60	ND	NC	30
		Barium	1.1	1.3	17	30
		Calcium	760	726	5	30
		Iron	118	105	12	30
		Magnesium	234	236	1	30
		Manganese	12.2	12.0	2	30
		Potassium	313	298	2	30
		Sodium	904	893	1	30
		Zinc	5.4	3.8	34	30

See notes at end of table.

Table 4-1 (Continued)
Precision Summary for Soil and Groundwater Field Duplicate Samples

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SDG Number	Sample ID	Compound	Sample Concentration (D_1)	Duplicate Concentration (D_2)	RPD (%)	Control Limit (%)
Groundwater						
WF026						
Organics (µg/ℓ)	16G00403	Acetone	3	2	40	40
		1,2-Dichloroethene (total)	1	2	67	40
		Benzene	600	600	0	40
		Phenol	8	8	0	40
		Naphthalene	1	2	67	40
		Bis(2-ethylhexyl)phthalate	1	ND	NC	40
Organics (µg/ℓ)	16G00403DL	Acetone	18	24	29	40
		Benzene	700	740	6	40
TAL Metals (mg/ℓ)	16G00403	Aluminum	278	290	4	25
		Arsenic	1.0	ND	NC	25
		Barium	28.6	27.5	4	25
		Calcium	3,110	3,300	6	25
		Chromium	2.3	2.9	23	25
		Copper	ND	1.3	NC	25
		Iron	1,370	879	44	25
		Lead	4.0	2.7	39	25
		Magnesium	1,320	987	29	25
		Manganese	41.3	33.5	21	25
		Potassium	540	713	28	25
		Sodium	2,570	2,590	0.8	25
		Vanadium	2.2	ND	NC	25
		Zinc	103	945	161	25
		Cyanide	2.9	1.6	58	25
WF027						
Organics (µg/ℓ)	16G00501	Bis(2-ethylhexyl)phthalate	2	ND	NC	40
TAL Metals (µg/ℓ)	16G00501	Aluminum	12.6	16.7	28	25
		Barium	10	10	0	25
		Calcium	239	234	2	25
		Cobalt	3.2	ND	NC	25
		Iron	9.2	5.3	54	25
		Magnesium	276	261	6	25

See notes at end of table.

Table 4-1 (Continued)
Precision Summary for Soil and Groundwater Field Duplicate Samples

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SDG Number	Sample ID	Compound	Sample Concentration (D_1)	Duplicate Concentration (D_2)	RPD (%)	Control Limit (%)
		Manganese	ND	2.1	NC	25
		Sodium	1,550	1,450	7	25
		Zinc	2.6	1.6	48	25
WF051						
Organics (µg/ℓ)	16G00401	Acetone	18	14	25	40
TAL Metals (mg/kg)	16G00101	Barium	20.5	20.7	1	25
		Calcium	514	520	1	25
		Copper	1.7	1.7	0	25
		Iron	11.2	14.7	27	25
		Magnesium	617	623	1	25
		Manganese	3.2	3.0	6	25
		Sodium	2,130	2,110	1	25
		Zinc	3.2	8.2	88	25

Notes: SDG = sample delivery group.
ID = identifier.
RPD = Relative Percent Difference.
% = percent.
µg/kg = micrograms per kilogram.
ND = not detected.
NC = not calculable.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyltrichloroethane.
mg/kg = milligrams per kilogram.
TAL = target analyte list.
D_1 = sample concentration.
D_2 = duplicate concentration.
µg/ℓ = micrograms per liter.

$$RPD = 100 \times \frac{|D_1 - D_2|}{0.5(D_1 + D_2)} \quad (1)$$

Table 4-2
Accuracy Exceedences for MS/MSD Samples

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SDG Number	MS/MSD Sample ID	Analyte	% Recovery MS/MSD	Control Limits (%)
Surface Soil				
WF013	16S01001	Phenol	-/96	26 to 90
		2-Chlorophenol	-/103	25 to 102
		Pentachlorophenol	-/110	17 to 109
Surface Water				
WF11A	09W00101	4-Chloro-3-methylphenol	104/107	23 to 97
		4-Nitrophenol	117/119	10 to 80
		2,4-Dinitrophenol	106/107	24 to 96
		Pentachlorophenol	120/119	96 to 103
Groundwater				
WF027	16G00501	4-Nitrophenol	91/91	10 to 80
		Pentachlorophenol	104/104	9 to 103

[1] MSD analysis are generally not performed for inorganic analysis; therefore, only the % recovery for the matrix spike is reported.

Notes: MS/MSD = matrix spike and matrix spike duplicate.
SDG = sample delivery group.
ID = identifier.
% = percent.
- = nothing detected.

the results of organic and inorganic MS/MSD analyses indicate that an acceptable level of accuracy was attained.

A summary of the surrogate spike samples and the surrogate compounds that were outside control limits for the Phase IIB samples collected at Site 16 is presented in Table 4-3. The required control limits were also identified for each surrogate compound. All the samples associated with these surrogates were qualified in accordance with the USEPA functional guidelines as presented in Subsection 3.3.4 of the GIR (HLA, 1998).

Initial calibrations were performed to ensure that the instrument was capable of producing acceptable qualitative and quantitative data for compounds on the volatile TCL. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. Continuing calibrations were performed to ensure that the instrument was capable of reproducing acceptable qualitative and quantitative data.

Continuing calibration establishes the 12-hour Relative Response Factor (RRF) on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. Initial and continuing calibrations for organic analytes are measured by the percent Relative Standard Deviation (%RSD) for initial calibrations and the percent Difference (%D) for continuing calibrations. Table 4-4 summarizes the organic compounds that exceeded the initial or continuing calibrations for surface soil and groundwater samples collected at Sites 16.

The evaluation of the %RSD for the initial calibrations and the %D for the continuing calibrations indicate that the response factors for the system performance check compounds (SPCCs) generally met the required criteria for VOCs, SVOCs, pesticides, and PCBs. Samples associated with those SDGs in which certain VOCs, SVOCs, pesticides, and PCBs exhibiting an RRF that did not meet the minimum requirements were qualified as UJ/J.

4.2.3 Representativeness Representativeness is the degree to which the data obtained from an environmental sample accurately reflects the presence or absence of contamination at a site. Field quality control samples (including source water blanks, equipment rinse blanks, and trip blanks) and laboratory quality control samples (including method blanks [organic analyses] and preparation blanks [inorganic analysis]) were used to assess representativeness. Representativeness also is assessed by review of the adherence to extraction and analysis holding times. The evaluation of representativeness in field quality control samples for Site 16 SDGs is presented in Table 4-5 and summarized below.

> **Trip Blanks**. Acetone and methylene chloride were detected in trip blanks with a concentration ranging from 2 to 6 micrograms per liter ($\mu g/\ell$) for acetone and 1 to 5 $\mu g/\ell$ for methylene chloride. Both acetone and methylene chloride are widely recognized as a laboratory contaminants commonly introduced during the calibration or cleaning of equipment.
>
> Environmental samples associated with the trip blanks with results greater than the Instrument Detection Limit (IDL) but less than 10 times the amount detected in the trip blank were appropriately annotated with a J or UJ qualifier (LDC, 1996-1997).

Table 4-3
Accuracy Summary for Surrogate Recoveries Outside QC Criteria

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SDG Number	Sample ID	Spiked Analyte	Surrogate Recovery (%R)	QC Limits (percent)
WF11A	16W00101	Decachlorobiphenyl	45/50	60 to 150
WF013	16S00801	Nitrobenzene-d5	3	23 to 120
		2-Fluorobiphenyl	3	30 to 115
		Terphenyl-d14	4	18 to 137
		Phenol-d5	2	24 to 113
		2-Fluorophenol	2	25 to 121
		2,4,6-Tribromophenol	3	19 to 122
		2-Chlorophenol-d4	3	20 to 130
		1,2-Dichlorobenzene-d4	2	20 to 130
	16R00101	Decachlorobiphenyl	58	60 to 150
	16S00101D	Tetrachloro-m-xylene	22/21	60 to 150
	16S00301	Tetrachloro-m-xylene	57	60 to 150
		Decachlorobiphenyl	57/54	60 to 150
	16S01001	Decachlorobiphenyl	44/41	60 to 150
	16S01201	Tetrachloro-m-xylene	55	60 to 150
	16S01301	Decachlorobiphenyl	55/55	60 to 150
WF023	16G00703	Decachlorobiphenyl	59/55	60 to 150
WF026	16G00201	Decachlorobiphenyl	43/37	60 to 150
	16G00203	Decachlorobiphenyl	44/43	60 to 150
	16G00403	Decachlorobiphenyl	40/39	60 to 150
	16G00403D	Decachlorobiphenyl	47/46	60 to 150
	16G00601	Decachlorobiphenyl	25/25	60 to 150
WF027	16G00304	Decachlorobiphenyl	46/43	60 to 150

Notes: QC = quality control.
SDG = sample delivery group.
ID = identifier.
%R = percent recovery.

Table 4-4
Summary of Compounds Exceeding Instrument Calibration for Site 16 SDGs

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SDG	Compound	Initial Calibration (%RSD)	Continuing Calibration (%D)	Qualifier
WF11A	Endosulfan I	22	--	UJ
WF013	1,1-Dichloroethene	33.9	--	UJ
	Carbon disulfide	32.8	--	UJ
	2-Hexanone	41.7	--	UJ
	Chloromethane	--	27.2	UJ
	Vinyl chloride	--	27.2	UJ
	Acetone	--	68.1	UJ/J
	2-Butanone	--	69.9	UJ
	1,2-Dichloroethane	--	29.6	UJ
	4-Methyl-2-pentanone	--	31.4	UJ
	Chloroethane	--	26.3	UJ
	Acetone	--	51.7	UJ/J
	2-Butanone	--	40.8	UJ
	1,2-Dichloroethane	--	35.4	UJ
	2-Hexanone	--	27.5	UJ
	Chloromethane	--	41.8	UJ
	Vinyl chloride	--	31.7	UJ
	Chloroethane	--	41.7	UJ
	Acetone	--	31.7	UJ/J
	Carbon Disulfide	--	25.8	UJ
	2-Hexanone	--	38.4	UJ
	Benzo(g,h,i)perylene	--	29.0	UJ/J
	Endosulfan sulfate	24.0	--	UJ
WF014	1,1-Dichloroethene	33.9	--	UJ
	Carbon disulfide	32.8	--	UJ
	Acetone	31.3	--	UJ/J
	Acetone	--	46.7	UJ/J
	Methylene chloride	--	32.3	UJ
	2-Butanone	--	54.2	UJ
	4-Methyl-2-pentanone	--	31.9	UJ
	2-Hexanone	--	60.0	UJ
	Acetone	--	36.7	UJ/J
	Benzo(k)fluoranthene	--	30.7	UJ/J
	4-Nitrophenol	--	38.2	UJ
	4-Nitroaniline	--	27.9	UJ

See notes at end of table.

Table 4-4 (Continued)
Summary of Compounds Exceeding Instrument Calibration for Site 16 SDGs

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SDG	Compound	Initial Calibration (%RSD)	Continuing Calibration (%D)	Qualifier
WF014	Pentachlorophenol	--	29.4	UJ
	Benzo(g,h,i)perylene	--	35.3	UJ/J
	Endosulfan sulfate	24.0	--	UJ
WF023	Acetone	30.2	--	J
	Acetone		33.2	J
	Acetone	--	30.4	J
	Methylene chloride	--	31.7	J
	Carbon disulfide	--	27.2	J
	Chloroethane	--	27.5	J
	Carbon disulfide	--	27.5	J
	Methylene chloride	--	37.8	J
	4-Nitroaniline	--	37.8	J
	Chrysene	--	27.8	J
	4-Nitroaniline	--	31.5	J
	Chrysene	--	28.5	J
	Benzo(g,h,i)perylene	--	32.7	J
	4,4'-DDT	23.6	--	J
WF026	Acetone	33.8	--	J
	Chloromethane	--	46.5	J
	Chloroethane	--	77.1	J
	1,1-Dichloroethane	--	28.6	J
	2-Butanone	--	30.3	J
	Chloromethane	--	32.5	J
	Chloroethane	--	32.4	J
	Acetone	--	37.9	J
	Carbon disulfide	--	28.0	J
	2-Butanone	--	27.8	J
	2,4-Dinitrophenol	--	35.6	J
	4-Nitroaniline	--	29.4	J
	4,6-Dinitro-2-methylphenol	--	32.0	J
	Pentachlorophenol	--	27.8	J
	3,3'-Dichlorobenzidine	--	27.8	J
	4-Chloroaniline	--	36.8	J
	3-Nitroaniline	--	37.9	J
	2,4-Dinitrophenol	--	29.3	J

See notes at end of table.

Table 4-4 (Continued)
Summary of Compounds Exceeding Instrument Calibration for Site 16 SDGs

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SDG	Compound	Initial Calibration (%RSD)	Continuing Calibration (%D)	Qualifier
	4-Nitroaniline	--	49.5	J
	4,6-Dinitro-2-methylphenol	--	29.4	J
	Pentachlorophenol	--	29.6	J
	3,3'-Dichlorobenzidine	--	54.1	J
	alpha-BHC	22.2	--	J
	delta-BHC	22.1	--	J
WF027	2-Butanone	39.1	--	J
	Acetone	33.8	--	J
	Acetone	--	102.4	J
	2-Butanone	--	36.3	J
	Acetone	--	37.9	J
	Carbon disulfide	--	28.0	J
	2-Butanone	--	27.8	J
	Bromomethane	--	31.0	J
	Chloroethane	--	63.9	J
	Acetone	--	37.2	J
	Chloromethane	--	32.4	J
	Chloroethane	--	28.4	J
	Acetone	--	49.2	J
	2-Butanone	--	38.7	J
	4-Methyl-2-pentanone	--	35.7	J
	2-Hexanone	--	38.9	J
	Chloromethane	--	27.4	J
	Acetone	--	34.7	J
	2-Butanone	--	32.6	J
	4-Methyl-pentanone	--	32.9	J
	2-Hexanone	--	38.9	J
	4-Choroaniline	--	36.8	J
	3-Nitroaniline	--	37.9	J
	2,4-Dinitrophenol	--	29.3	J
	4-Nitroaniline	--	49.5	J
	4,6-Dinitro-2-methylphenol	--	29.4	J
	Pentachlorophenol	--	29.6	J
	3,3'-Dichlorobenzidine	--	54.1	J
	3,3'-Dichlorobenzidine	--	30.4	J

See notes at end of table.

Table 4-4 (Continued)
Summary of Compounds Exceeding Instrument Calibration for Site 16 SDGs

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SDG	Compound	Initial Calibration (%RSD)	Continuing Calibration (%D)	Qualifier
WF031B	Di-*n*-octylphthalate	--	25.3	J
	Alpha-BHC	23.9	--	J
WF037	Di-*n*-octylphthalate	--	25.3	J
	Alpha-BHC	23.9	--	J

Notes: SDG = sample delivery group.
%RSD = percent relative standard deviation for initial calibrations.
%D = percent difference for continuing calibrations.
-- = not detected.
UJ = The analyte was not detected above the reported sample instrument detection limit (IDL); however, the reported concentration is approximate and may not reliably be presumed to be less than the IDL value.
J = The analyte was positively identified and is reported as an approximate concentration.
DDT = dichlorodiphenyltrichloroethane.
BHC = delta hexachlorocyclohexane.

Table 4-5
Representativeness Summary for Field QC Samples for Site 16 SDGs

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SDG:	WF013		WF023	WF026	WF027		WF031B
Sample ID:	16T00101	16R00101	16T01301	16T01801	16R01501	16T01901	16T04001
Collect Date:	09-JAN-96	09-JAN-96	25-JUL-96	15-AUG-96	21-AUG-96	19-AUG-96	21-NOV-96
Sample Type:	Trip Blank	Rinsate Blank	Trip Blank	Trip Blank	Rinsate Blank	Trip Blank	Trip Blank
Volatile Organic Compounds (µg/ℓ)							
Acetone	--	--	2	3	--	6	--
Methylene Chloride	--	--	--	1	--	5	--
Semivolatile Organic Compounds (µg/ℓ)							
Di-*n*-butylphthalate	NA	5	NA	NA	5	NA	NA
bis(2-ethylhexyl)phthalate	NA	--	NA	NA	--	NA	NA
Pesticides and PCBs (µg/ℓ)							
None detected							
Inorganic Analytes (µg/ℓ)							
Arsenic	NA	--	NA	NA	0.5 U	NA	NA
Barium	NA	--	NA	NA	--	NA	NA
Beryllium	NA	--	NA	NA	--	NA	NA
Calcium	NA	--	NA	NA	64.0 U	NA	NA
Chromium	NA	--	NA	NA	--	NA	NA
Copper	NA	--	NA	NA	--	NA	NA
Iron	NA	7.0 UJ	NA	NA	--	NA	NA
Lead	NA	--	NA	NA	0.80	NA	NA
Manganese	NA	--	NA	NA	--	NA	NA
Mercury	NA	--	NA	NA	--	NA	NA
Nickel	NA	--	NA	NA	--	NA	NA
Sodium	NA	30.0 UJ	NA	NA	26.9 U	NA	NA
Zinc	NA	3.4 UJ	NA	NA	1.8	NA	NA
TRPH	NA	--	NA	NA	--	NA	NA
Cyanide	NA	--	NA	NA	--	NA	NA

See notes at end of table.

Table 4-5 (Continued)
Representativeness Summary for Field QC Samples for Site 16 SDGs

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

SDG:	WF037	WF051					
Sample ID:	16T04001	16R03501	16R03601	16T06801	16T06901	16T07001	16T07101
Collect Date:	21-NOV-97	21-JUL-97	23-JUL-97	21-JUL-97	22-JUL-97	23-JUL-97	25-JUL-97
Sample Type:	Trip Blank	Rinsate Blank	Rinsate Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Volatile Organic Compounds (μg/ℓ)							
Acetone	--	--	NA	3	--	--	--
Methylene chloride	--	1	NA	1	--	--	--
Semivolatile Organic Compounds (μg/ℓ)							
Di-*n*-butylphthalate	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	--	--	--	--	--	--	--
Pesticides and PCBs (μg/ℓ)							
None detected							
Inorganic Analytes (μg/ℓ)							
Arsenic	NA	NA	--	NA	NA	NA	NA
Barium	NA	NA	--	NA	NA	NA	NA
Beryllium	NA	NA	--	NA	NA	NA	NA
Cadmium	NA	NA	--	NA	NA	NA	NA
Calcium	NA	NA	166 U	NA	NA	NA	NA
Chromium	NA	NA	--	NA	NA	NA	NA
Copper	NA	NA	1.7 U	NA	NA	NA	NA
Iron	NA	NA	12.7 U	NA	NA	NA	NA
Lead	NA	NA	1.2	NA	NA	NA	NA
Manganese	NA	NA	0.68 U	NA	NA	NA	NA
Mercury	NA	NA	--	NA	NA	NA	NA
Nickel	NA	NA	--	NA	NA	NA	NA
Sodium	NA	NA	48.9 U	NA	NA	NA	NA

See notes at end of table.

Table 4-5 (Continued)
Representativeness Summary for Field QC Samples for Site 16 SDGs

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

SDG:	WF037	WF051					
Sample ID:	16T04001	16R03501	16R03601	16T06801	16T06901	16T07001	16T07101
Collect Date:	21-NOV-97	21-JUL-97	23-JUL-97	21-JUL-97	22-JUL-97	23-JUL-97	25-JUL-97
Sample Type:	Trip Blank	Rinsate Blank	Rinsate Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Inorganic Analytes ($\mu g/\ell$) (Continued)							
Zinc	NA	NA	2.6 U	NA	NA	NA	NA
TRPH	NA	NA	--	NA	NA	NA	NA
Cyanide	NA	NA	--	NA	NA	NA	NA

Notes: QC = quality control.
SDG = sample delivery group.
ID = identifier.
$\mu g/\ell$ = micrograms per liter.
-- = analyte not detected.
NA = not analyzed.
PCB = polychlorinated biphenyl.
U = sample result modified based on associated method blank.
J = estimated value.

Rinsate Blanks. One VOC (methylene chloride) was detected at a concentration of 1 $\mu g/\ell$ in a groundwater rinsate blank. One SVOC (di-*n*-butylphthalate) was detected at a concentration of 5 $\mu g/\ell$.

Inorganics detected at concentrations exceeding the IDL but less than the contract-required detection limits (CRDLs) are lead and zinc. Lead was detected in two groundwater rinsate blanks at concentrations of 0.8 and 1.2 $\mu g/\ell$. Zinc was detected at a concentration of 1.8 $\mu g/\ell$ in one rinsate blank.

Laboratory Method and Preparation Blanks. Concentrations of VOCs, SVOCs, and metals were detected in the laboratory method blanks associated with SDGs WF11A, WF013, WF014, WF023, WF026, WF027, WF031B, WF037, and WF051.

Environmental samples associated with method blanks that contained methylene chloride and acetone with results greater than IDL but less than 10 times the amount detected in the laboratory preparation blanks were annotated with UJ qualifier (LDC, 1996-1997). For metals, sample results greater than IDL but less than 5 times the amount detected in the laboratory preparation blanks were appropriately annotated with a J or UJ qualifier (LDC, 1996-1997).

Sampling and analysis holding times for each analytical fraction were met in all samples.

Qualification of the environmental samples were required because of the detection of target analytes in laboratory and field blanks. Qualification of the RI data, based on blank contamination, was performed according to USEPA data validation guidelines (USEPA, 1994a and USEPA, 1994b). According to the data validation (LDC, 1996-1997), the analytes detected in the QA/QC blanks are considered common contaminants and were found at typical concentrations; therefore, the analytical results are considered to be representative.

4.2.4 Comparability Comparability is the confidence with which one data set can be compared with another and the degree to which the environmental data from each sampling event are considered equivalent. Comparability of the analytical data was assured by using standard operating procedures for sample collection, by using standard chemical analytical methods, and by reporting the analytical results in standard units (SUs). The sampling, shipment, and analytical protocols were consistent with USEPA standard operation procedures and methodologies described in work plans for NAS Whiting Field throughout the period of the RI.

4.2.5 Completeness Completeness is the percentage of useable data reported and validated compared with the total number of measurements made. Useable data are those measurements that were not rejected (qualified with an "R") during the validation process. Some of the analytical data were rejected. A few samples from SDG WF013 have metals data which were rejected. The goal for analytical completeness for the RI sampling event was 85 percent useable data. The completeness goal of 85 percent was met for all matrices and all parameters.

4.3 SUMMARY. Based on the results of the QC sample analyses, the established precision, accuracy, and representativeness goals of the project were achieved

(Table 4-6). Some field and/or laboratory-derived contamination was present in some of the QC samples which required the results of some environmental samples to be amended. QC sample results and data validation criteria indicated that a 94.4 to 100 percent completeness goal was achieved, thus satisfying the 85 percent goal. Standard methods of analyses and units of measure were used throughout the project; therefore, the QC criteria and the DQOs presented in the work plan were achieved.

Overall, the data generated during the sampling events meet established DQOs and are acceptable for use in site characterization, risk assessment, and evaluation of corrective measures.

Table 4-6
Summary of DQO Assessment - PARCC Parameters

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Sample Type	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
Surface Soil Samples - Site 16					
SDG WF013 and WF014					
TCL VOC	Acceptable	Acceptable	Acceptable	100	Acceptable
TCL SVOCs	Acceptable	Acceptable	Acceptable	99.5[3]	Acceptable
Pesticides and PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
TAL Metals and Total Cyanides	Acceptable	Acceptable	Acceptable	100	Acceptable
Surface Water Sample - Site 16					
SDG WF11A					
TCL VOC	Acceptable	Acceptable	Acceptable	100	Acceptable
TCL SVOCs	Acceptable	Acceptable	Acceptable	100	Acceptable
Pesticides and PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
TAL Metals and Total Cyanides	Acceptable	Acceptable	Acceptable	100	Acceptable
Groundwater Samples - Site 16					
SDG WF023, WF026, WF027, WF031B, WF037, and WF051					
TCL VOC	Acceptable	Acceptable	Acceptable	100	Acceptable
TCL SVOCs	Acceptable	Acceptable	Acceptable	100	Acceptable
Pesticides and PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
TAL Metals and Total Cyanides[4]	Acceptable	Acceptable	Acceptable	100	Acceptable

[1] Cumulative of sampling and analytical components.
[2] Analytical component.
[3] A few samples have results whose concentrations were rejected.
[4] The accuracy for cyanide measurements associated with SDG WF037 was found to be unacceptable.

Notes: All the units are expressed as the ratio of number of analytes meeting the quality control criteria to the total number of analytes.

DQO = data quality objective.
PARCC = precision, accuracy, reproducibility, completeness, and comparability.
% = percent.
TCL = target compound list.
VOC = volatile organic compound.
SVOC = semivolatile organic compound.
TAL = target analyte list.
PCB = polychlorinated biphenyl.

5.0 INVESTIGATIVE RESULTS

The following sections present the interpretation of geology and hydrogeology for the Southwest Disposal Area (i.e., Site 15 the Southwest Disposal Area and Site 16 the Open Disposal and Burning Area). Geophysical survey data, as well as analytical results of soil gas, surface soil, subsurface soil, surface water, and groundwater sampling events are presented for Site 16.

5.1 GEOLOGIC RESULTS. This section presents the results of the Phase IIA and IIB geologic investigations of Site 16 and, when necessary to present a clearer hydrogeologic picture, Site 15.

Surface soils (up to 12 inches deep) of the sites are generally described in test pit logs (Appendix C) as tan to yellowish-orange (fine- to very fine-grained) sand or tan to brown (fine- to very fine-grained) silty sand. The shallow soil (2 to 7 feet bls) tends to be red-orange to light tan in color and contains thin interbedded sand, silt, and clay layers at many exploration locations.

The subsurface lithology (greater than 7 feet bls) of Sites 15 and 16 consists of poorly graded (very fine- to medium-grained) sands displaying various shades of yellow, brown, and gray. Layers of well graded sands, clay, and silt are common to the deep borings at both sites (Monitoring Well Logs, Appendix C-2). The soil from shallow depths (referred to as interbedded sands, silts, and clays on cross sections) tends to be darker in color and contains significant amounts of clay and silt.

A plan view of Sites 15 and 16 is provided on Figure 5-1 and the geology of the two sites is depicted in cross sections (Figures 5-2, 5-3, and 5-4). These cross sections show that a continuous clay layer is not present directly beneath the Southwest Disposal Area. A 3-foot-thick clay layer was encountered sporadically during drilling, but is likely discontinuous across the area. Clay was detected at Site 15 in monitoring wells WHF-15-3D and WHF-15-5. These layers are relatively thin and discontinuous. Clay detected at Site 16 is beneath the northern area of the landfill (WHF-16-4D) and is not found in the southern area of the landfill. Clay exceeding 30 feet in thickness is present at a depth of approximately 65 feet bls at monitoring well WHF-16-2D (ABB-ES, 1995a). The horizontal extent of this layer is not known.

Detailed lithologic descriptions can be found in the boring and monitoring well logs presented in the RI Phase IIA Technical Memorandum No. 2 (ABB-ES, 1995a): A general discussion of the geology at NAS Whiting Field is presented in Subsection 1.4.5 of the GIR (HLA, 1998).

5.2 HYDROGEOLOGIC RESULTS. The hydrogeologic assessment included determining horizontal and vertical hydraulic gradients, hydraulic conductivities, and seepage velocities.

Groundwater Flow Direction. Table 5-1 summarizes the results of the water-level elevation measurements Sites 15 and 16. Figures 5-5 and 5-6 show groundwater

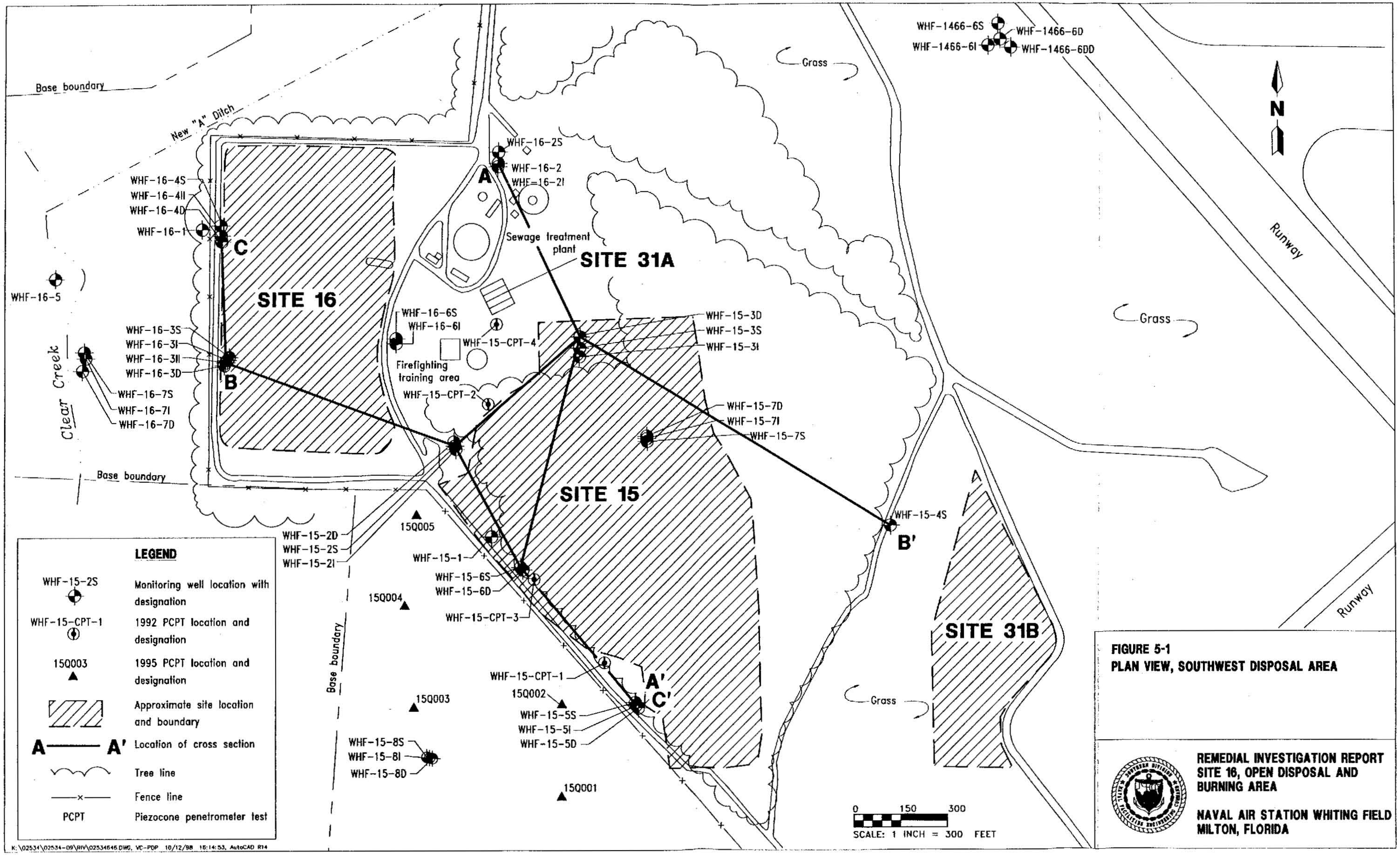

FIGURE 5-1
PLAN VIEW, SOUTHWEST DISPOSAL AREA

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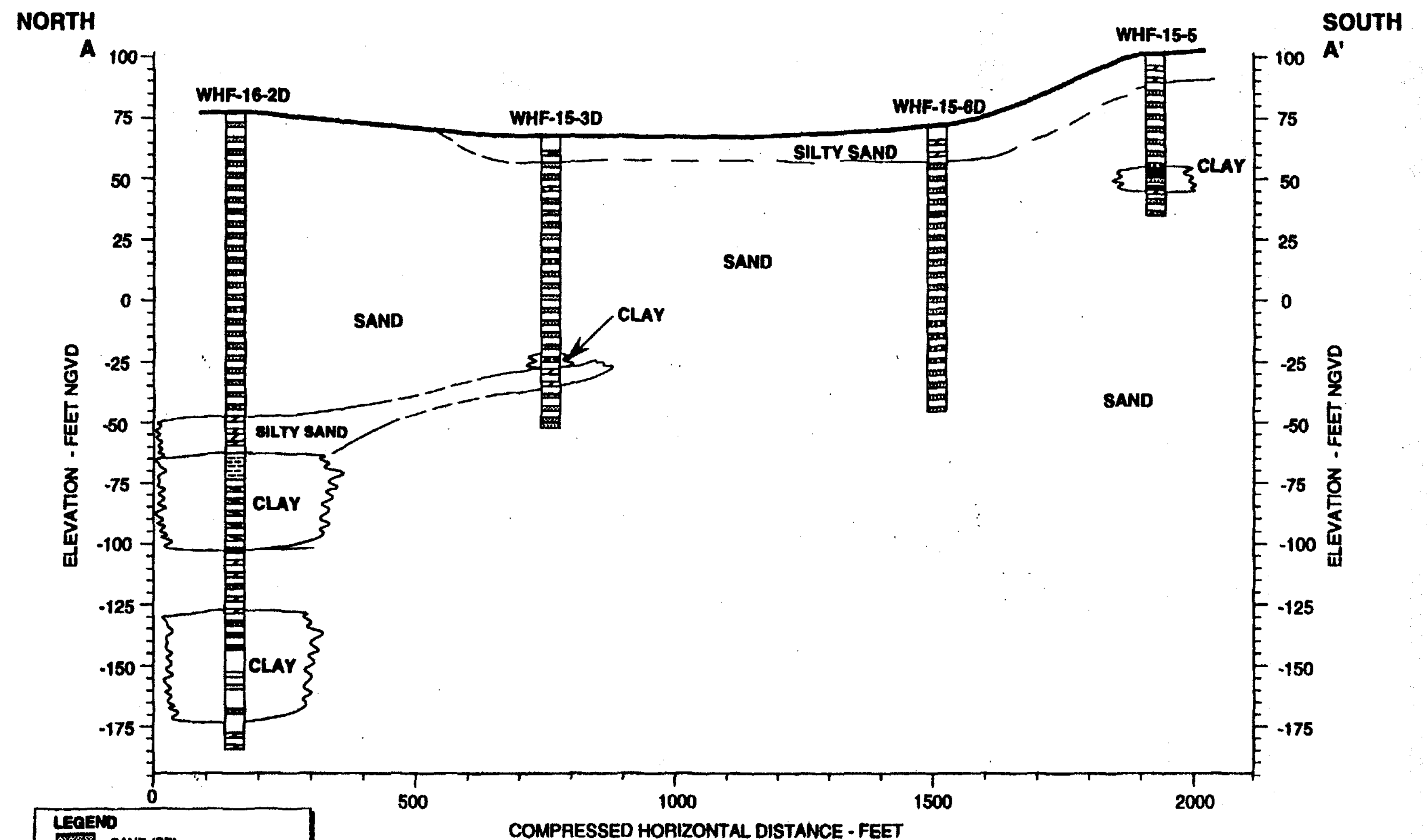

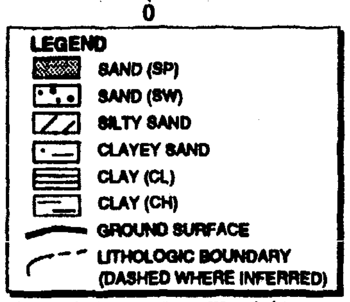

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FIGURE 5-2

GEOLOGIC CROSS SECTION
SOUTHWEST DISPOSAL AREA
NORTH TO SOUTH, A TO A'

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND
BURNING AREA

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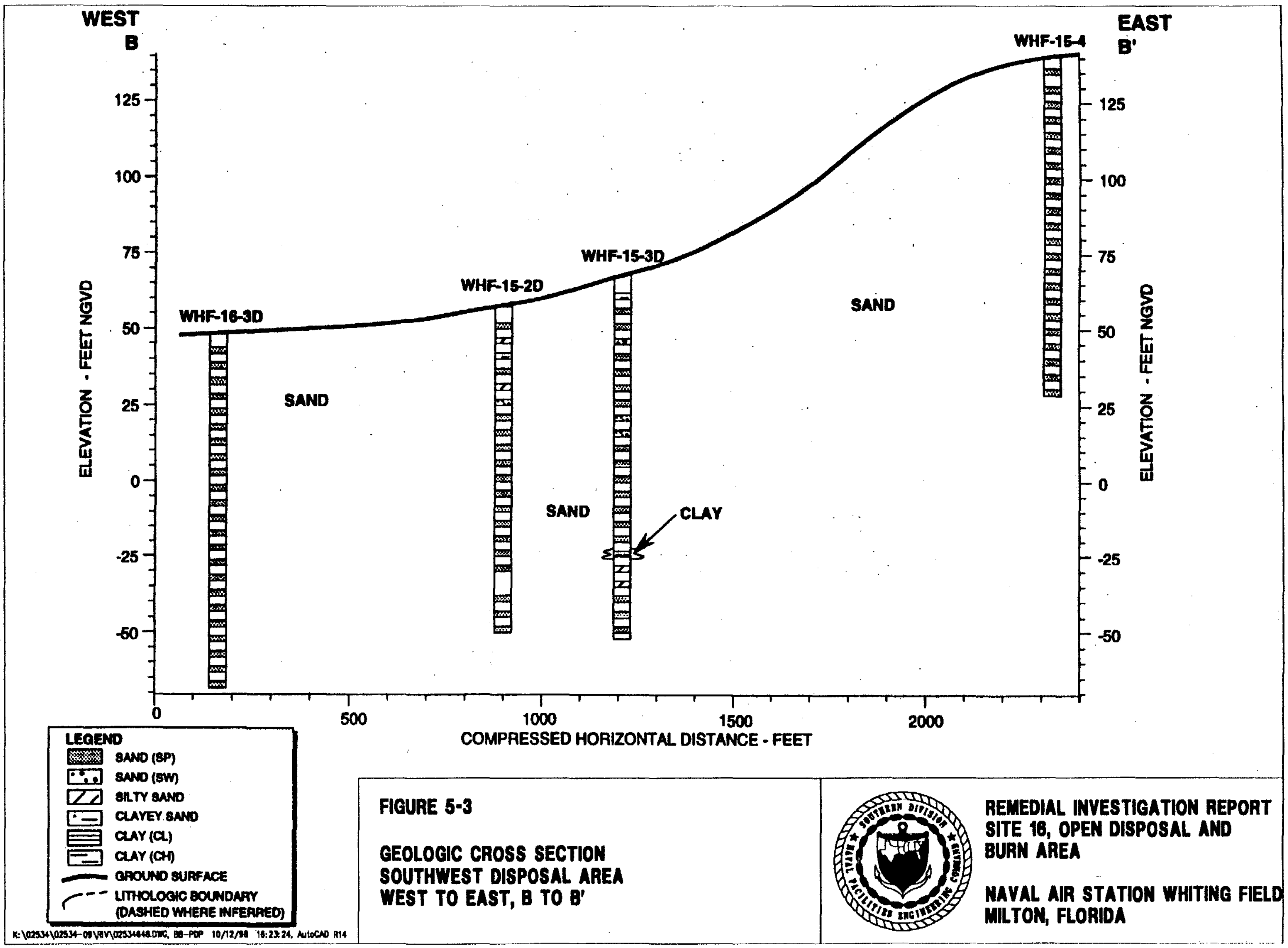
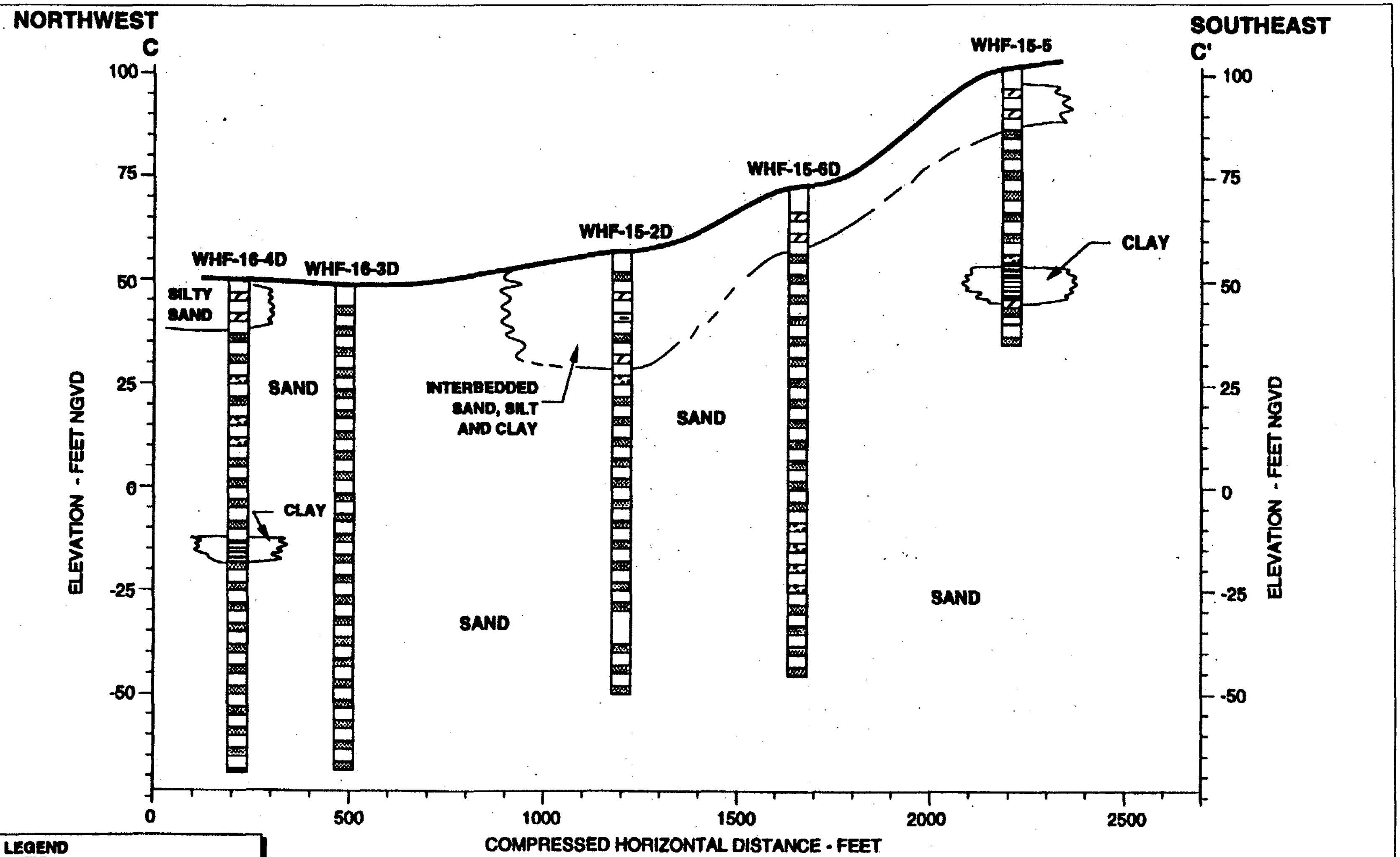


FIGURE 5-3

GEOLOGIC CROSS SECTION SOUTHWEST DISPOSAL AREA WEST TO EAST, B TO B'

REMEDIAL INVESTIGATION REPORT SITE 16, OPEN DISPOSAL AND BURN AREA

NAVAL AIR STATION WHITING FIELD MILTON, FLORIDA



LEGEND

- SAND (SP)
- SAND (SW)
- SILTY SAND
- CLAYEY SAND
- CLAY (CL)
- GROUND SURFACE
- LITHOLOGIC BOUNDARY (DASHED WHERE INFERRED)

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FIGURE 5-4

GEOLOGIC CROSS SECTION
SOUTHWEST DISPOSAL AREA
NORTHWEST TO SOUTHEAST, C TO C'

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND
BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

flow patterns as potentiometric surface maps for the periods of January 16 through 18 and August 7 through 9, 1997. The data indicated a groundwater flow direction to the south-southwest.

Horizontal and Vertical Gradients. Table 5-2 provides a summary of the horizontal hydraulic gradients calculated for the Southwest Disposal Area. The horizontal hydraulic gradients at Site 16 ranged from 0.0058 feet per foot (ft/ft) (monitoring wells WHF-16-6S and WHF-16-3S) to 0.0068 ft/ft (monitoring wells WHF-16-2S and WHF-16-4S). The average hydraulic gradients in each measurement event were 0.0063 ft/ft for January 1997 and 0.0060 ft/ft for August 1997. The overall average horizontal hydraulic gradient for all measurement events was 0.0061 ft/ft.

Table 5-3 presents a summary of the vertical hydraulic gradients calculated for the Southwest Disposal Area. The vertical hydraulic gradients were calculated using six well pairs at Site 16 in January and August of 1997. Values calculated for the paired monitoring wells in January ranged from -0.0015 ft/ft (upward movement) to 0.023 ft/ft (downward movement). Vertical hydraulic gradients were mostly in a downward direction.

Hydraulic Conductivity and Seepage Velocity. Thirteen slug tests were conducted during the RI and the hydraulic conductivity values calculated from slug test data are summarized in Table 5-4. A minimum of three trials of rising head slug tests were conducted for each monitoring well in the Southwest Disposal Area. A more detailed presentation of the evaluation of hydraulic conductivity data is presented in Section 2.3 (Table 2-2) of Technical Memorandum No. 4, Hydrogeologic Assessment (ABB-ES, 1995c).

The average hydraulic conductivity values for individual monitoring wells at Site 16 ranged from 0.27 feet per day (ft/day) (9.5×10^{-5} centimeters per second [cm/sec]) for WHF-16-3D to 46.5 ft/day (1.64×10^{-2} cm/sec) for WHF-16-3II. The geometric mean of the hydraulic conductivity values for Site 16 is 22.2 ft/day (7.8×10^{-3} cm/sec) or approximately 8,000 feet per year.

Seepage Velocity. Table 5-5 summarizes the average linear pore water velocity (seepage velocities) for the water table zone of the sand-and-gravel aquifer for sites in the Southwest Disposal Area. The calculations used an assumed effective porosity (n) of 0.35 for the area. The value represents silty through poorly graded sands (Fetter, 1988). Seepage velocities for Site 16 ranged from 0.56 to 0.77 ft/day.

5.3 GEOPHYSICAL RESULTS. A multi-instrument geophysical survey was conducted at Site 16 in May and June 1992 (ABB-ES, 1993). Results of the magnetic, EM conductivity, and EM in-phase surveys all confirmed the lateral extent of the landfill, as shown on figures in Appendix B. Anomalies observed during the Site 16 survey are described below.

Two main landfill features were interpreted from the EM and total field data sets (Figure 5-6). The feature located in the northern portion of the site is approximately 400 feet by 350 feet. The feature located in the southern portion of the site is more irregular in shape with approximate dimensions of 370 feet by 550 feet. The western boundary of both features extends, at least, to the western site boundary fence line; because of interference by the metallic

Table 5-1
Summary of Water-Level Elevations

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Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (feet BTOC)	January 16 to 18, 1997		August 7 to 9, 1997	
			Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet above msl)	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet above msl)
Southwest Disposal Area						
Site 15, Southwest Landfill						
WHF-15-1	66.35	73.60	24.54	41.81	25.51	40.84
WHF-15-2S	59.58	32.90	16.79	42.79	18.09	41.49
WHF-15-2I	60.10	63.20	18.01	42.09	18.93	41.17
WHF-15-2D	59.39	112.44	17.33	42.06	18.24	41.15
WHF-15-3S	69.29	37.94	23.63	45.66	24.80	44.49
WHF-15-3I	69.69	87.83	24.25	45.44	25.57	44.12
WHF-15-3D	69.44	119.48	23.59	45.85	24.85	44.59
WHF-15-4S	143.29	109.15	95.55	47.74	97.24	46.05
WHF-15-5S	104.14	68.18	62.34	41.80	63.40	40.74
WHF-15-5I	105.17	98	63.40	41.77	64.46	40.71
WHF-15-5D	106.11	128.38	64.34	41.77	65.40	40.71
WHF-15-6S	74.29	43.73	32.14	42.15	33.12	41.17
WHF-15-6D	75.08	123.36	33.19	41.89	34.15	40.93
WHF-15-7S	120.18	88.85	73.36	47.09	74.90	45.55
WHF-15-7I	119.85	121.5	73.03	47.14	74.56	45.61
WHF-15-7D	119.49	147.53	72.63	47.18	74.17	45.64
WHF-15-8S	79.67	55	41.67	38.00	41.79	37.88
WHF-15-8I	79.48	85.2	41.48	38.00	42.24	37.24
WHF-15-8D	79.08	115	41.09	37.99	42.35	36.73
Site 16, Open Disposal Burning Area						
WHF-16-1	50.04	43.00	10.26	39.76	10.87	39.17
WHF-16-2	82.19	74.20	--	--	--	--
WHF-16-2S	83.66	49.80	35.26	46.93	36.49	45.70
WHF-16-2I	80.60	130.14	33.88	46.72	35.11	45.49
WHF-16-3S	51.69	23.25	12.23	39.46	12.92	38.77
WHF-16-3I	51.31	52.87	12.04	39.27	12.67	38.64
WHF-16-3II	51.22	78.91	12.12	39.10	12.75	38.47
WHF-16-3D	51.40	118.08	8.34	43.06	9.28	42.12
WHF-16-4S	54.79	22.38	14.15	40.64	14.86	39.93
WHF-16-4II	53.01	64.80	12.81	40.20	13.47	39.54
WHF-16-4D	52.87	122.54	12.80	40.07	13.45	39.42

See notes at end of table.

Table 5-1 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (feet BTOC)	January 16 to 18, 1997		August 7 to 9, 1997	
			Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet above msl)	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet above msl)
Southwest Disposal Area						
Site 16, Open Disposal Burning Area (Continued)						
WHF-16-5	37.54	10.00	3.35	34.19	3.67	33.87
WHF-16-6S	56.57	26	13.96	42.61	14.73	41.84
WHF-16-6D	56.77	62.1	14.18	42.61	15.09	41.68
WHF-16-7S	38.27	14	3.53	34.74	4.00	34.27
WHF-16-7I	38.17	46.5	2.11	36.06	2.50	35.67
WHF-16-7D	38.05	75.2	1.99	36.06	2.39	35.66
Site 1466, Aviation Gas Disposal Area						
WHF-1466-6S	173.40	173.09	118.48	54.61	120.63	52.46
WHF-1466-6I	173.01	173.06	118.43	54.63	120.61	52.45
WHF-1466-6D	173.21	173.05	118.50	54.55	120.62	52.43
WHF-1466-6DD	172.86	173.90	118.37	54.49	120.49	52.37

Notes: TOC = top-of-casing.
msl = mean sea level.
BTOC = below top of casing.
-- = not available.

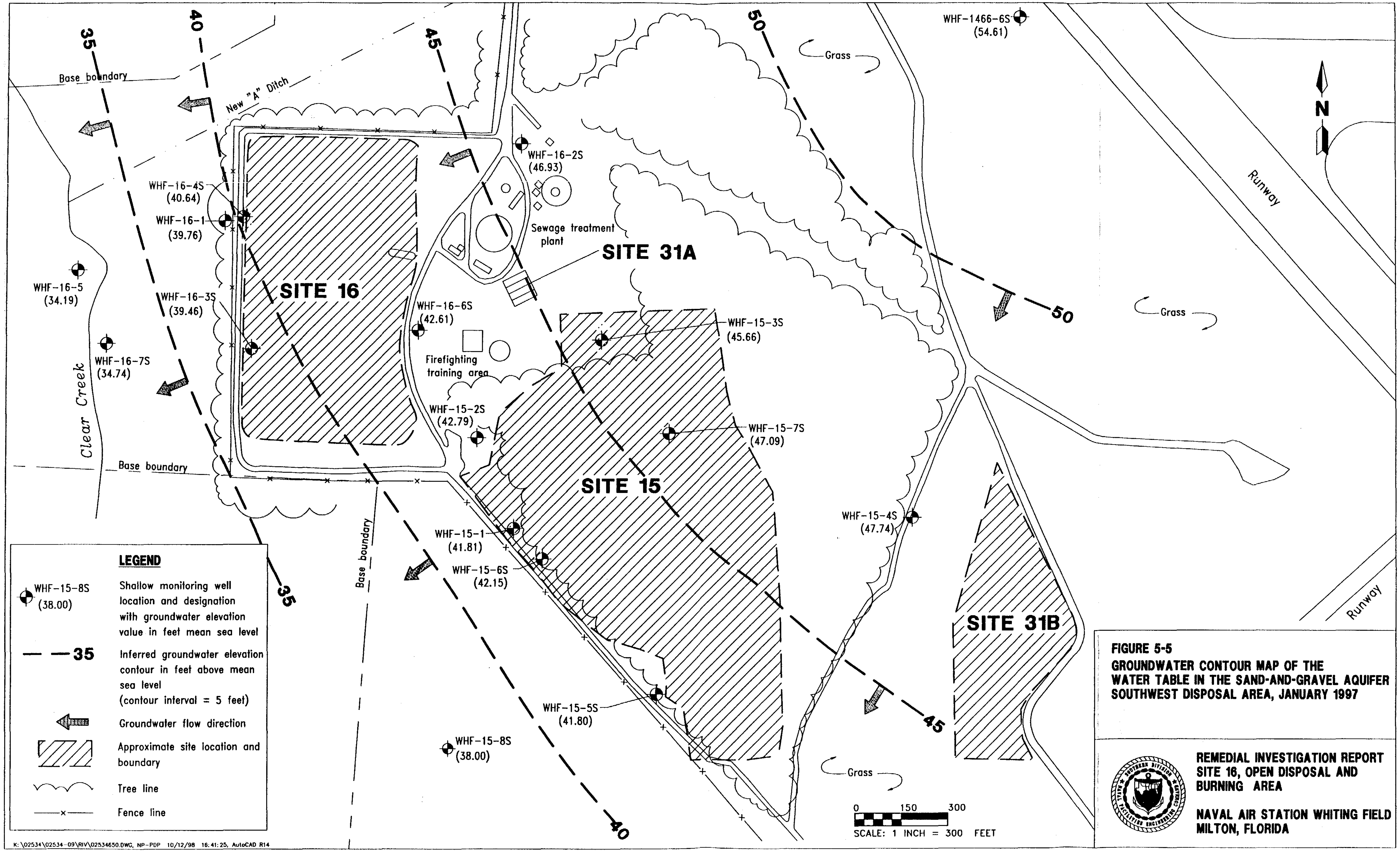

FIGURE 5-5
GROUNDWATER CONTOUR MAP OF THE WATER TABLE IN THE SAND-AND-GRAVEL AQUIFER SOUTHWEST DISPOSAL AREA, JANUARY 1997

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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Table 5-2
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	January 16 to 18, 1997		August 7 to 9, 1997	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
Southwest Disposal Area					
Site 16, Open Disposal Burning Area					
WHF-16-2S	930	46.93	0.0068	45.70	0.0062
WHF-16-4S		40.64		39.93	
WHF-16-6S	540	42.61	0.0058	41.84	0.0057
WHF-16-3S		39.46		38.77	
	Average gradient		0.0063		0.0060

Notes: msl = mean sea level.
ft/ft = feet per foot.

Table 5-3
Summary of Vertical Hydraulic Gradients

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Well Number	Bottom of Well Elevation (msl)	Vertical Distance Between Screens (feet)	January 16 to 18, 1997			August 7 and 9, 1997		
			Groundwater Elevation (msl)	Vertical Gradient (ft/ft)[1]	Vertical Flow Direction	Groundwater Elevation (msl)	Vertical Gradient (ft/ft)	Vertical Flow Direction
Southwest Disposal Area								
Site 16, Open Disposal Burning Area								
WHF-16-3S	23.25	29.12	39.46	0.006	Downward	38.77	0.0045	Downward
WHF-16-3I	52.87	26.54	39.27	0.006	Downward	38.64	0.006	Downward
WHF-16-3II	78.91	39.17	39.10	0.101	Upward	38.47	-0.093	Upward
WHF-16-3D	118.08		43.06			42.12		
WHF-16-4S	22.38	41.42	40.64	0.0106	Downward	39.93	0.009	Downward
WHF-16-4II	64.80	47.74	40.20	0.0027	Downward	39.54	0.0025	Downward
WHF-16-4D	122.54		40.07			39.42		
WHF-16-6S	26	36.1	42.61	0.0	Stagnant	41.84	0.0044	Downward
WHF-16-6D	62.1		42.61			41.68		

[1] Vertical gradients are computed as follows: the difference between groundwater elevations of associated monitoring wells is divided by the vertical distance between screened intervals.

Notes: msl = mean sea level.
ft/ft = feet per foot.

Table 5-4
Summary of Hydraulic Conductivity (K) Data from Slug Tests

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Well Number	Range of K (ft/day)	Number of Usable Runs	Average K (ft/min)	Average K (ft/day)	Average K (cm/sec)
Site 16, Open Disposal Burning Area					
WHF-16-2S	27.20 to 30.96	4	0.020015	28.8	1.01×10^{-5}
WHF-16-2I	9.18 to 10.39	4	0.00676	9.7	3.4×10^{-4}
WHF-16-3S	3.99 to 4.55	3	0.0298	42.9	1.51×10^{-5}
WHF-16-3I	4.92 to 5.28	5	0.00352	5.06	1.78×10^{-4}
WHF-16-3II	43.9 to 49.1	3	0.03228	46.5	1.64×10^{-5}
WHF-16-3D	0.27 to 0.299	3	0.00019	0.27	9.5×10^{-2}
			Geometric Mean	22.2	7.8×10^{-4}

Notes: Average is the arithmetic average

ft/day = feet per day.
ft/min = feet per minute.
cm/sec = centimeters per second.

Table 5-5
Summary of Seepage Velocities

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Investigation Area	Monitoring Well Pair	Horizontal[1] Gradient (ft/ft)	K[2] (ft/day)	Effective Porosity (n)	Seepage Velocity (ft/day)[3]
Site 16, Open Disposal Burning Area	WHF-16-4S and WHF-16-2S	0.0069	28.8	0.35	0.56
	WHF-16-6S and WHF-16-3S	0.0063	42.9	0.35	0.77
				Arithmetic average	0.38

[1] Horizontal gradients are the average value for all groundwater measurements performed between September 30, 1993, and November 9, 1996.
[2] The K is averaged where values are available for both wells in the well pair.
[3] The seepage velocity is computed as follows: seepage velocity = (horizontal gradient) X (K)/(effective porosity).

Notes: ft/ft = feet per foot.
K = hydraulic conductivity.
ft/day = feet per day.

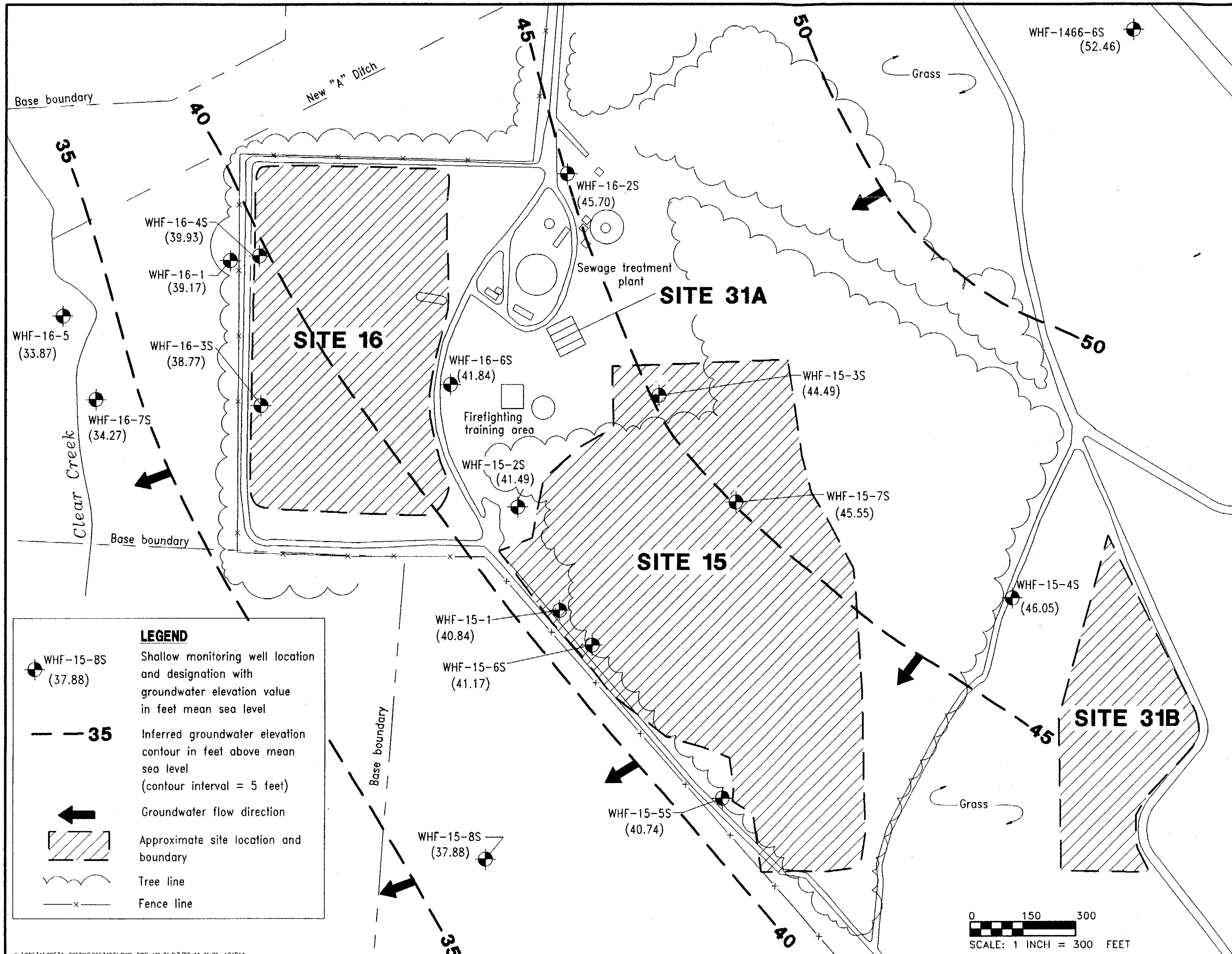

FIGURE 5-6
GROUNDWATER CONTOUR MAP OF THE WATER TABLE IN THE SAND-AND-GRAVEL AQUIFER SOUTHWEST DISPOSAL AREA, AUGUST 1997

REMEDIAL INVESTIGATION REPORT SITE 16, OPEN DISPOSAL AND BURNING AREA

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fencing, EM induction could not be used in proximity of the fence to accurately define and confirm the actual boundary.

Several small geophysical anomalies were detected east of the southern landfill feature (Figure 3-1). These smaller features were interpreted to be random disposal areas, rather than points of controlled filling activities. A mounded feature, located at grid coordinates 680E, 190S (Figure B-1, Appendix B of this report) was associated with a high amplitude magnetic anomaly and a conductivity anomaly. This suggests a pit may have been dug at this location and filled with ferromagnetic metal and subsequently covered.

The survey grid was extended to the east in an attempt to extend past all the anomalies. But after three attempts, it was discontinued because these isolated anomalies appeared to be not associated with the open disposal activities at Site 16. The potential for the existence of buried drums at this location was not investigated further.

5.4 SOIL GAS SURVEY. The soil gas screening program consisted of sampling 60 locations at Site 16 (Figure 3-1). The soil gas samples were analyzed in the field with either a Portafid II™ or a Foxboro OVA-128™ OVA and recorded. The methodology is described in Section 3.1 of this report. Table 5-6 presents the analytical results obtained from the soil gas survey including total VOCs and methane (filtered reading) from depths of 1.5 and 3.0 feet bls. Figures 5-7 through 5-10 present these results as isopleth maps that were prepared using the data generated by the soil gas screening event. These figures show that soil gas samples collected near the eastern boundary of the site have measurable concentrations of total VOCs and methane. This suggests that land-filled materials are generating the organic vapors.

5.5 SURFACE SOIL ANALYTICAL RESULTS. Tables 5-7 and 5-8 summarize the analytical results for organic and inorganic analytes detected in the 20 surface soil samples and 3 duplicates collected at Site 16. Tables 5-9, 5-10, and 5-11 summarize the frequency of detection, range of detection limits, range of detection concentrations, mean of detected concentrations, and background screening values for the combined background data set for Troup loamy sand and Lakeland sand soil types, and SCTLs for Florida and the USEPA Region III RBCs (Florida Department of Environmental Protection [FDEP], 1999). The surface soil sample locations and analytical results above SCTLs are shown on Figure 5-11.

Organic analytes detected in surface soil samples consist of 2 VOCs, 14 SVOCs, 6 pesticides, and 2 PCBs.

VOCs. Toluene and xylenes (total) were the only VOCs detected in the 20 surface soil samples (and two duplicates) collected at Site 16. Toluene was detected in one sample (16S00501) at a concentration of 1.0 micrograms per kilogram (μg/kg). Xylenes (total) were detected in three samples (16-SL-01, 16-SL-02, and 16-SL-03) at a concentrations ranging from 1.0 to 5.0 μg/kg. Detected concentrations of the two VOCs are lower than the Florida residential and industrial SCTLs and the USEPA Region III RBCs for residential- and industrial-use soil.

TCL SVOCs. Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, carbazole, chrysene, dibenzo(a,h)-anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and bis(2-ethylhexyl)phthalate were detected in surface soil samples collected at Site 16.

Table 5-6
Summary of Active Soil Gas Survey, July 26 through August 14, 1995

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Sample ID	Depth (feet)	Total VOC (ppm)	Methane (ppm)	Methane/VOC (percent)	Rinsate Blank (ppm)
16V011	1.5	0	0	NA	0
	3.0	0	0	NA	
16V012	1.5	1	0	0	2
	3.0	120	80	67	
16V013	1.5	4	1	25	0
	3.0	W	W	NA	
16V014	1.5	0	0	NA	0
	3.0	0	0	NA	
16V015	1.5	0	0	NA	0
	3.0	0	0	NA	
16V016	1.5	2	0	0	1
	3.0	0	0	NA	
16V017	1.5	0	0	NA	3
	3.0	W	W	NA	
16V018	1.5	2	0	0	1
	3.0	W	W	NA	
16V019	1.5	2	0	0	1
	3.0	3	0	0	
16V020	1.5	0	0	NA	2
	3.0	0	0	NA	
16V021	1.5	0	0	NA	0
	3.0	0	0	NA	
16V022	1.5	0	0	NA	1
	3.0	0	0	NA	
16V023	1.5	NS	NS	NA	0
	3.0	NS	NS	NA	
16V024	1.5	0	0	NA	0
	3.0	0	0	NA	
16V025	1.5	0	0	NA	0
	3.0	0	0	NA	
16V026	1.5	0	0	NA	0
	3.0	0	0	NA	
16V027	1.5	1	0	0	6
	3.0	3	0	0	

See notes at end of table.

Table 5-6 (Continued)
Summary of Active Soil Gas Survey, July 26 through August 14, 1995

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
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Milton, Florida

Sample ID	Depth (feet)	Total VOC (ppm)	Methane (ppm)	Methane/VOC (percent)	Rinsate Blank (ppm)
16V028	1.5	0	0	NA	0
	3.0	0	0	NA	
16V029	1.5	NS	NS	NA	0
	3.0	27	27	100	
16V030	1.5	0	0	NA	1
	3.0	0	0	NA	
16V031	1.5	0	0	NA	0
	3.0	3	0	0	
16V032	1.5	0	0	NA	1
	3.0	0	0	NA	
16V033	1.5	2	1	50	1
	3.0	70	70	100	
16V034	1.5	0	0	NA	0
	3.0	2,000	1,500	75	
16V035	1.5	2	2	100	0
	3.0	>5,000	>5,000	NA	
16V036	1.5	W	W	NA	0
	3.0	W	W	NA	
16V037	1.5	0	0	NA	0
	3.0	0	0	NA	
16V038D	1.5	0	0	NA	0
	3.0	2,500	1,500	60	
16V039	1.5	0	0	NA	0
	3.0	0	0	NA	
16V040	1.5	0	0	NA	0
	3.0	0	0	NA	
16V041	1.5	0	0	NA	0
	3.0	0	0	NA	
16V042	1.5	0	0	NA	2
	3.0	0	0	NA	
16V043	1.5	0	0	NA	0
	3.0	2	0	0	
16V044	1.5	600	300	50	0
	3.0	1,300	1,300	100	

See notes at end of table.

Table 5-6 (Continued)
Summary of Active Soil Gas Survey, July 26 through August 14, 1995

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
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Sample ID	Depth (feet)	Total VOC (ppm)	Methane (ppm)	Methane/VOC (percent)	Rinsate Blank (ppm)
16V045	1.5	0	0	NA	0
	3.0	>5,000	>5,000	NA	
	4.5	>1,000	>1,000	NA	
	6.0	>1,000	>1,000	NA	
16V046	1.5	0	0	NA	0
	3.0	0	0	NA	
16V047	1.5	0	0	NA	2
	3.0	3	1	33	
16V048	1.5	0	0	NA	0
	3.0	0	0	NA	
16V049	1.5	0	0	NA	0
	3.0	0	0	NA	
16V050	1.5	0	0	NA	0
	3.0	0	0	NA	
16V051	1.5	0	0	NA	0
	3.0	0	0	NA	
16V052	1.5	0	0	NA	0
	3.0	2	2	NA	
16V053	1.5	1	0	0	0
	3.0	NS	NS	NA	
16V054	1.5	0	0	NA	0
	3.0	0	0	NA	
16V055	1.5	1,200	1,200	100	1
	3.0	1,800	1,800	100	
16V056	1.5	0	0	NA	0
	3.0	0	0	NA	
16V057	1.5	0	0	NA	0
	3.0	0	0	NA	
16V058	1.5	0	0	NA	0
	3.0	0	0	NA	
16V059	1.5	0	0	NA	0
	3.0	0	0	NA	
16V060	1.5	0	0	NA	0
	3.0	0	0	NA	

See notes at end of table.

Table 5-6 (Continued)
Summary of Active Soil Gas Survey, July 26 through August 14, 1995

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Sample ID	Depth (feet)	Total VOC (ppm)	Methane (ppm)	Methane/VOC (percent)	Rinsate Blank (ppm)
16V061	1.5	0	0	NA	0
	3.0	0	0	NA	
16V062	1.5	5	0	0	1
	3.0	0	0	NA	
16V063	1.5	0	0	NA	0
	3.0	0	0	NA	
16V064	1.5	0	0	NA	0
	3.0	0	0	NA	
16V065	1.5	0	0	NA	0
	3.0	0	0	NA	
16V066	1.5	0	0	NA	1
	3.0	0	0	NA	
16V067	1.5	0	0	NA	2
	3.0	0	0	NA	
16V068	1.5	0	0	NA	0
	3.0	0	0	NA	
16V069	1.5	0	0	NA	0
	3.0	0	0	NA	
16V070	1.5	0	0	NA	0
	3.0	0	0	NA	

Notes: ID = identification.
VOC = volatile organic compound.
ppm = parts per million.
W = water saturated soil
NA = not applicable.
NS = not sampled.
> = greater than.

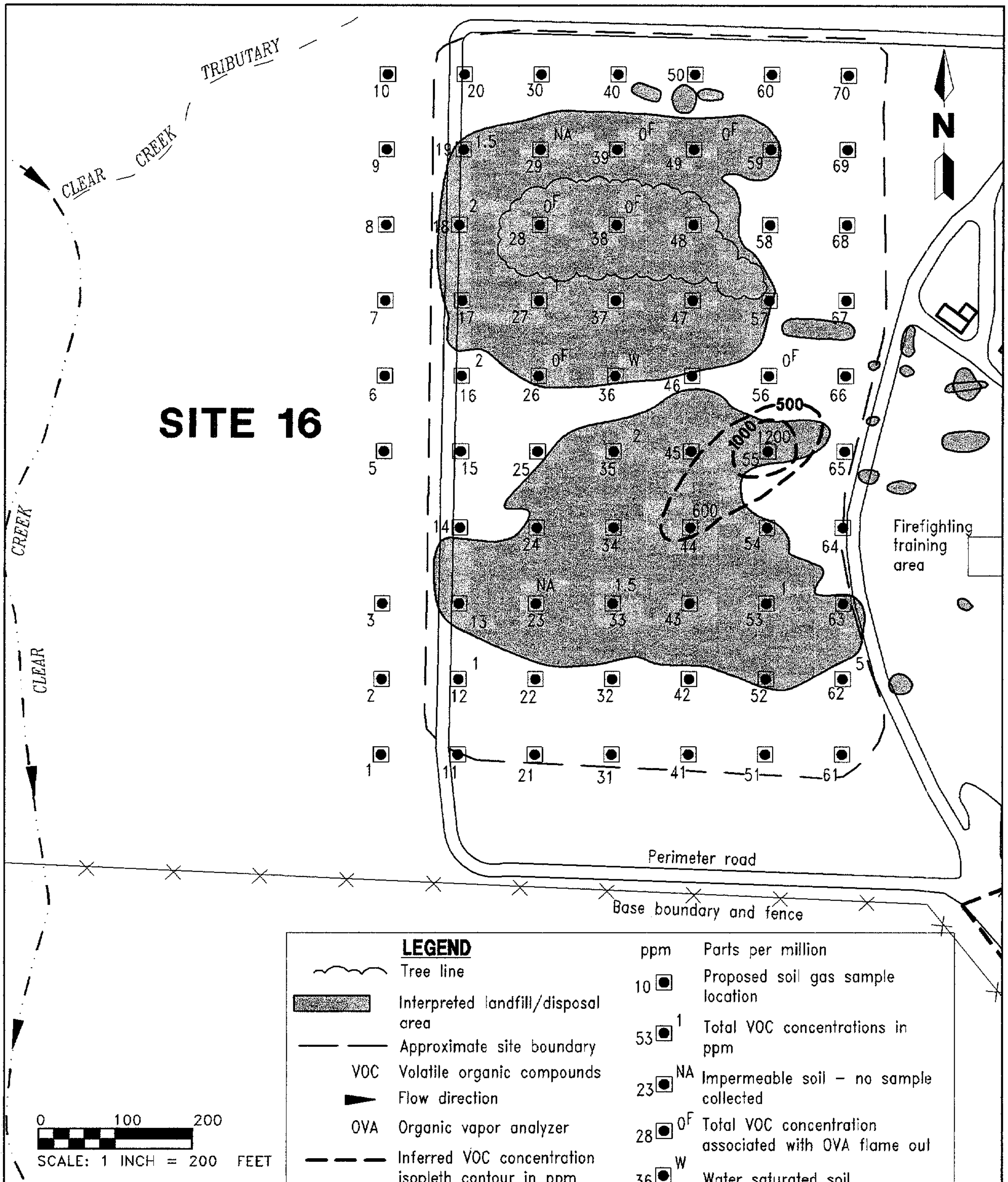

FIGURE 5-7
DISTRIBUTION OF INTERPRETED TOTAL VOC CONCENTRATIONS DETECTED AT 1.5 FEET BELOW LAND SURFACE IN SOIL GAS FIELD SCREENING SAMPLES

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REMEDIAL INVESTIGATION REPORT SITE 16, OPEN DISPOSAL AND BURNING AREA

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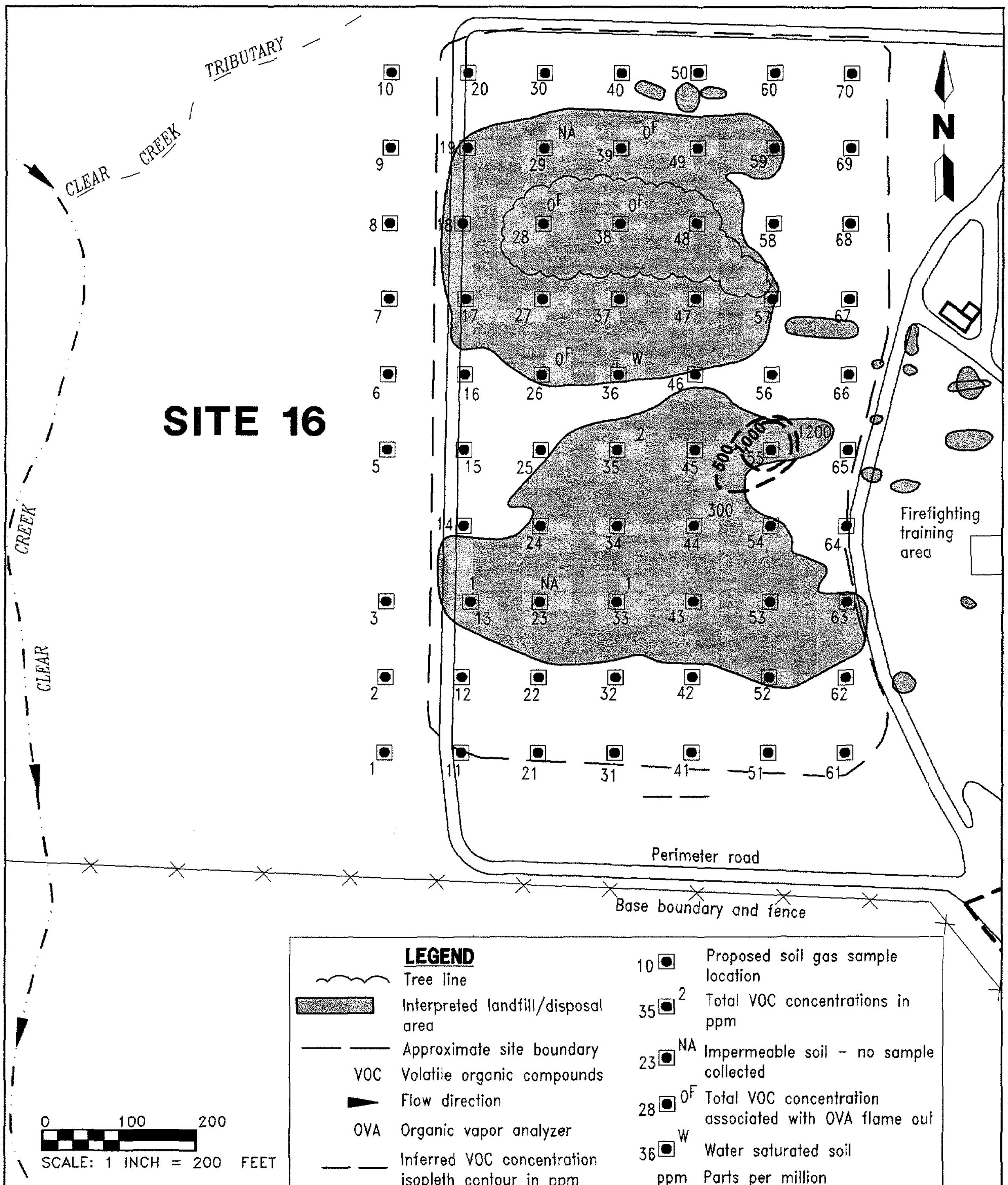

FIGURE 5-8

DISTRIBUTION OF INTERPRETED METHANE CONCENTRATIONS DETECTED AT 1.5 FEET BELOW LAND SURFACE IN SOIL GAS FIELD SCREENING SAMPLES

REMEDIAL INVESTIGATION REPORT SITE 16, OPEN DISPOSAL AND BURNING AREA

NAVAL AIR STATION WHITING FIELD MILTON, FLORIDA

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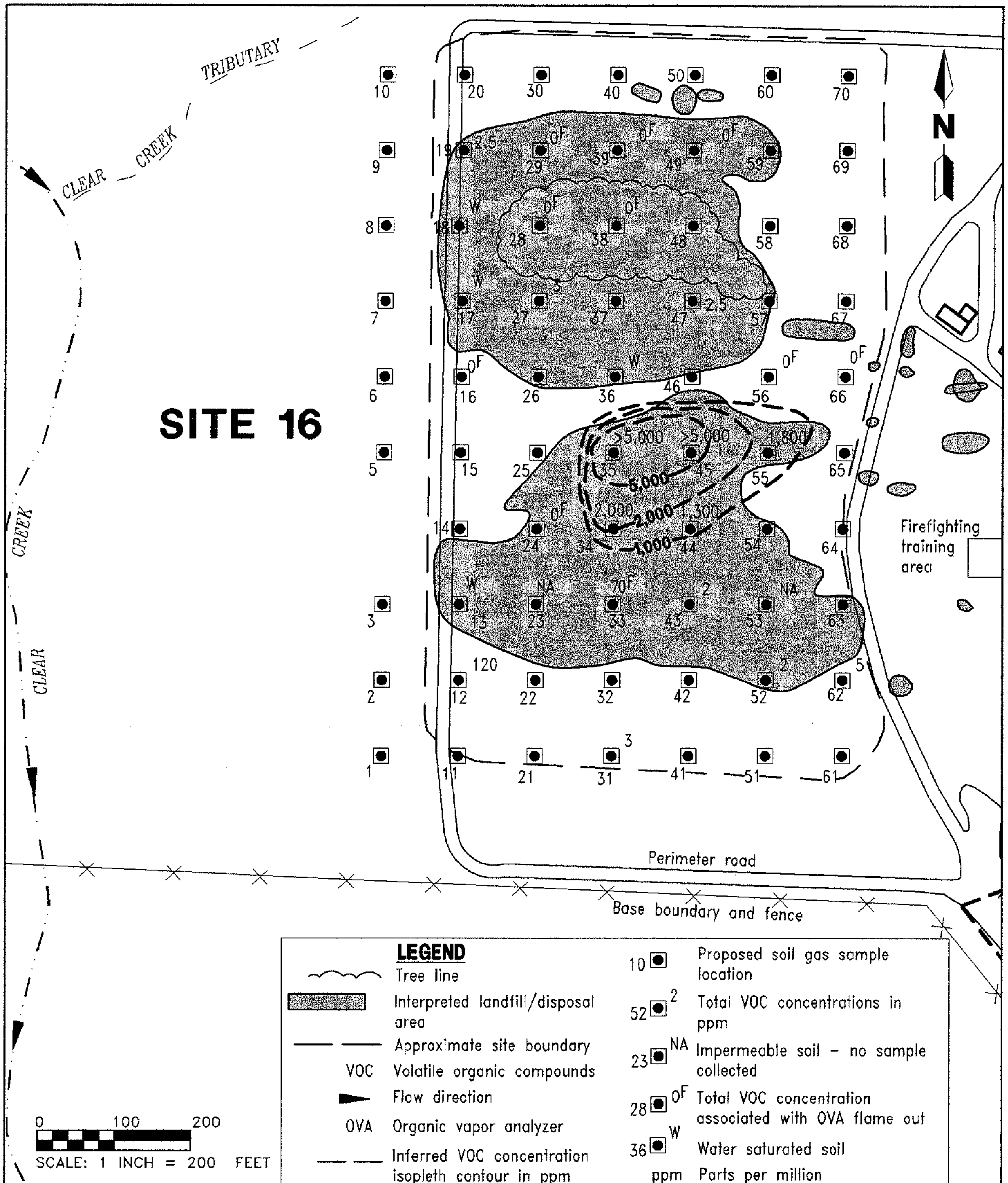

FIGURE 5-9
DISTRIBUTION OF INTERPRETED TOTAL VOC CONCENTRATIONS DETECTED AT 3.0 FEET BELOW LAND SURFACE IN SOIL GAS FIELD SCREENING SAMPLES

REMEDIAL INVESTIGATION REPORT SITE 16, OPEN DISPOSAL AND BURNING AREA

NAVAL AIR STATION WHITING FIELD MILTON, FLORIDA

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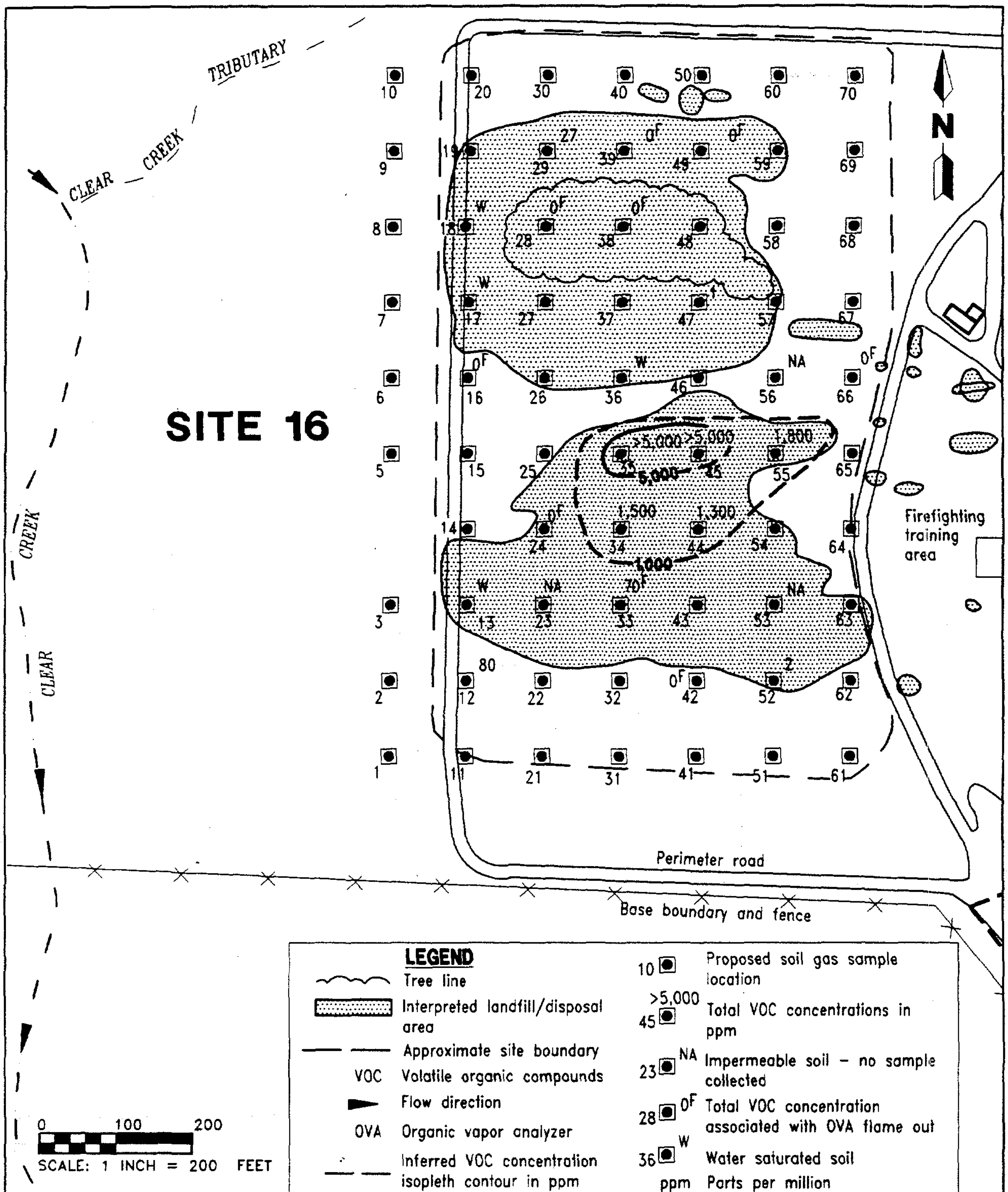

FIGURE 5-10
DISTRIBUTION OF INTERPRETED METHANE CONCENTRATIONS DETECTED AT 3.0 FEET BELOW LAND SURFACE IN SOIL GAS FIELD SCREENING SAMPLES

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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Table 5-7
Organic Analytes Detected in Site 16 Surface Soil Samples

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Location Identifier:	16-SL-01	16-SL-02	16-SL-03	16S001	16S001	16S002	16S003	16S004
Sample Identifier:	16-SL-01	16-SL-02	16-SL-03	16S00101	16S00101D	16S00201	16S00301	16S00401
Date Sampled:	11-AUG-92	11-AUG-92	11-AUG-92	08-JAN-96	08-JAN-96	09-JAN-96	09-JAN-96	08-JAN-96
Laboratory Sample No.:	S22454002	S22454003	S22454004	RA856001	RA856018	RA856006	RA856007	RA856003
<u>Volatile Organic Compounds</u> (μg/kg)								
Toluene	--	--	--	--	--	--	--	--
Xylenes (total)	5 J	2 J	1 J	--	--	--	--	--
<u>Semivolatile Organic Compounds</u> (μg/kg)								
Anthracene	--	--	--	--	--	--	--	--
Benzo(a)anthracene	--	--	--	--	--	--	--	--
Benzo(a)pyrene	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--
Carbazole	--	--	--	--	--	--	--	--
Chrysene	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	--	--	--	--	--	--	--	--
Fluoranthene	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--
Phenanthrene	--	--	--	--	--	--	--	--
Pyrene	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	--	--	43 J	--	--	--	--	--
<u>Pesticides and PCBs</u> (μg/kg)								
4,4'-DDD	--	--	--	--	--	--	--	--
4,4'-DDE	--	5.5 J	5.5 J	3.2 J	2 J	--	--	--
4,4'-DDT	--	9.1 J	5.2 J	3.8 J	2.7 J	--	--	--
Aroclor-1254	--	--	--	--	--	--	36 J	--
Aroclor-1260	--	--	--	--	--	--	--	--
Dieldrin	33	--	--	--	--	--	2.5 J	--
alpha-Chlordane	--	--	--	--	--	--	--	--
gamma-Chlordane	--	--	--	--	--	--	--	--

See notes at end of table.

Table 5-7 (Continued)
Organic Analytes Detected in Site 16 Surface Soil Samples

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Naval Air Station Whiting Field
Milton, Florida

Location Identifier:	16S005	16S006	16S007	16S008	16S009	16S010	16S010	16S011
Sample Identifier:	16S00501	16S00601	16S00701	16S00801	16S00901	16S01001	16S01001D	16S01101
Date Sampled:	08-JAN-96	09-JAN-96	10-JAN-96	09-JAN-96	08-JAN-96	09-JAN-96	09-JAN-96	10-JAN-96
Laboratory Sample No.:	RA856002	RA856009	RA870004	RA856008	RA856004	RA856014	RA856015	RA870005
Volatile Organic Compounds (µg/kg)								
Toluene	1 J	--	--	--	--	--	--	--
Xylenes (total)	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds (µg/kg)								
Anthracene	--	95 J	--	--	--	--	--	--
Benzo(a)anthracene	--	2,300	250 J	--	67 J	--	--	56 J
Benzo(a)pyrene	--	3,100	310 J	--	130 J	--	--	71 J
Benzo(b)fluoranthene	--	3,600	350 J	--	300 J	--	--	86 J
Benzo(g,h,i)perylene	--	1,200	120 J	--	--	--	--	--
Benzo(k)fluoranthene	--	3,200	340 J	--	--	--	--	73 J
Carbazole	--	97 J	--	--	--	--	--	--
Chrysene	--	3,200	270 J	--	120 J	--	--	62 J
Dibenzo(a,h)anthracene	--	700	110 J	--	--	--	--	--
Fluoranthene	--	2,300	260 J	--	86	--	--	59 J
Indeno(1,2,3-cd)pyrene	--	1,900	240 J	--	90 J	--	--	--
Phenanthrene	--	440	52 J	--	--	--	--	--
Pyrene	--	1,700	170 J	--	150	--	--	44 J
bis(2-Ethylhexyl)phthalate	--	--	110 J	50 J	--	--	58 J	78 J
Pesticides and PCBs (µg/kg)								
4,4'-DDD	--	--	18 J	--	--	--	--	2.1 J
4,4'-DDE	--	100	53	--	11	13 J	22	51
4,4'-DDT	--	89	22	--	16	6.4 J	9	28
Aroclor-1254	--	--	--	130	--	--	--	--
Aroclor-1260	--	--	--	--	--	48 J	110 J	--
Dieldrin	--	130	--	9.2	17	33 J	60	--
alpha-Chlordane	--	--	--	--	2.6 J	6.8 J	12 J	--
gamma-Chlordane	--	--	--	--	2.2 J	4 J	7.9 J	--

See notes at end of table.

Table 5-7 (Continued)
Organic Analytes Detected in Site 16 Surface Soil Samples

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Location Identifier:	16S012	16S013	16S014	16S015	16S016	16S017
Sample Identifier:	16S01201	16S01301	16S01401	16S01501	16S01601	16S01701
Date Sampled:	09-JAN-96	09-JAN-96	10-JAN-96	08-JAN-96	10-JAN-96	10-JAN-96
Laboratory Sample No.:	RA856010	RA856011	RA870003	RA856005	RA870007	RA870006
Volatile Organic Compounds (μg/kg)						
Toluene	--	--	--	--	--	--
Xylenes (total)	--	--	--	--	--	--
Semivolatile Organic Compounds (μg/kg)						
Anthracene	--	--	--	--	--	--
Benzo(a)anthracene	--	--	--	--	--	--
Benzo(a)pyrene	120 J	--	--	--	--	--
Benzo(b)fluoranthene	--	--	--	--	--	--
Benzo(g,h,i)perylene	490	--	--	--	--	--
Benzo(k)fluoranthene	--	--	--	--	--	--
Carbazole	--	--	--	--	--	--
Chrysene	54 J	--	--	--	--	--
Dibenzo(a,h)anthracene	--	--	--	--	--	--
Fluoranthene	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	62 J	--	--	--	--	--
Phenanthrene	--	--	--	--	--	--
Pyrene	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	--	--	--	--	45 J	48 J
Pesticides and PCBs (μg/kg)						
4,4'-DDD	--	--	--	--	--	--
4,4'-DDE	26 J	--	--	--	--	--
4,4'-DDT	7.1 J	--	--	--	--	--
Aroclor-1254	--	--	--	--	--	--
Aroclor-1260	--	--	--	--	--	--

See notes at end of table.

Table 5-7 (Continued)
Organic Analytes Detected in Site 16 Surface Soil Samples

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Location Identifier:	16S012	16S013	16S014	16S015	16S016	16S017
Sample Identifier:	16S01201	16S01301	16S01401	16S01501	16S01601	16S01701
Date Sampled:	09-JAN-96	09-JAN-96	10-JAN-96	08-JAN-96	10-JAN-96	10-JAN-96
Laboratory Sample No.:	RA856010	RA856011	RA870003	RA856005	RA870007	RA870006
Pesticides and PCBs (μg/kg) (Continued)						
Dieldrin	2.9 J	7.2 J	--	--	--	--
alpha-Chlordane	--	1.6 J	--	--	--	--
gamma-Chlordane	--	1 J	--	--	--	--

Notes: μg/kg = micrograms per kilogram.
-- = analyte not detected.
J = estimated value.
PCB = polychlorinated biphenyl.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyltrichloroethane.

Table 5-8
Inorganic Analytes Detected in Site 16 Surface Soil Samples

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Location Identifier:	16-SL-01	16-SL-02	16-SL-03	16S001	16S001	16S002	16S003	16S004
Sample Identifier:	16-SL-01	16-SL-02	16-SL-03	16S00101	16S00101D	16S00201	16S00301	16S00401
Date Sampled:	11-AUG-92	11-AUG-92	11-AUG-92	08-JAN-96	08-JAN-96	09-JAN-96	09-JAN-96	08-JAN-96
Laboratory Sample No.:	S22454002	S22454003	S22454004	RA856001	RA856018	RA856006	RA856007	RA856003
Inorganic Analytes (mg/kg)								
Aluminum	10,900	18,600	14,200	4,250 J	5,840 J	6,570 J	10,600 J	11,100 J
Antimony	--	--	--	--	--	--	--	--
Arsenic	1.9 J	1.4 J	3.1	0.94 J	1.2 J	1.6 J	2.5 J	1.5 J
Barium	19.4 J	14.7 J	42.9 J	13.2 J	13.6 J	11.2 J	42.8 J	13.1 J
Beryllium	0.12 J	0.12 J	0.12 J	0.09 J	--	--	0.11 J	0.09 J
Cadmium	--	--	1.6	0.28 J	0.3 J	0.36 J	0.43 J	0.25 J
Calcium	427 J	345 J	1,180 J	210 J	173 J	260 J	907 J	80.8 J
Chromium	10.5	14.7	14.9	4	5.8	4.5	11.2	10.3
Cobalt	1.3 J	0.95 J	1.7 J	--	--	--	1.4 J	--
Copper	9.7	8.3	50.8	4.8 J	--	3.8 J	13.2	4.4 J
Cyanide	--	--	--	0.12 J	0.12 J	--	0.13 J	--
Iron	6,300	8,150	13,600	2,340 J	2,910 J	4,090 J	5,450 J	5,160 J
Lead	76	6.7 J	121	7.8 J	7.5 J	6.5 J	74.3 J	4.4 J
Magnesium	106 J	134 J	228 J	103 J	150 J	91.3 J	264 J	127 J
Manganese	80.3	19.2	228	185	151	97.2	123	95.8
Mercury	--	--	0.1	--	--	--	--	--
Nickel	--	--	5.5 J	--	1.9 J	--	2.7 J	2.3 J
Potassium	--	--	230 J	--	--	--	--	--
Selenium	--	--	--	0.19 J	--	--	--	0.15 J
Silver	--	--	0.87 J	--	--	--	--	--
Sodium	196 J	189 J	232 J	129 J	--	120 J	157 J	--
Thallium	--	--	--	--	--	--	0.18 J	0.13 J
Vanadium	23.2	28.9	22.7	6.8 J	8.6 J	10.2 J	19.4	17.5
Zinc	22.7	12.5	128	6.4	6.9	8	59.2	6.3

See notes at end of table.

Table 5-8 (Continued)
Inorganic Analytes Detected in Site 16 Surface Soil Samples

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Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Location Identifier:	16S005	16S006	16S007	16S008	16S009	16S010	16S010	16S011
Sample Identifier:	16S00501	16S00601	16S00701	16S00801	16S00901	16S01001	16S01001D	16S01101
Date Sampled:	08-JAN-96	09-JAN-96	10-JAN-96	09-JAN-96	08-JAN-96	09-JAN-96	09-JAN-96	10-JAN-96
Laboratory Sample No.:	RA856002	RA856009	RA870004	RA856008	RA856004	RA856014	RA856015	RA870005
Inorganic Analytes (mg/kg)								
Aluminum	5,610 J	7,890 J	8,820 J	9,300 J	8,050 J	2,000 J	1,780 J	8,210 J
Antimony	--	--	5.9 J	--	--	--	--	--
Arsenic	1.3 J	2.2 J	5.6	3.4	2.8	0.76 J	0.64 J	12.1
Barium	6.1 J	53.6	257	13.3 J	55.7	4.9 J	4 J	92.5
Beryllium	0.06 J	0.08 J	--	0.11 J	0.11 J	--	--	0.06 J
Cadmium	--	2.2	7.6	--	--	--	--	--
Calcium	70.8 J	796 J	2,350	302 J	1,080	101 J	99.8 J	1,230
Chromium	4	11.5	29.2	11	11.3	3.9	3.3	24.5
Cobalt	0.69 J	1.5 J	4.1 J	--	--	--	--	3.9 J
Copper	--	71.7	202	5.2 J	20	10.2	8.6	139
Cyanide	0.14 J	0.2 J	--	--	0.18 J	0.1 J	0.17 J	--
Iron	3,220 J	10,300 J	30,300	6,380 J	5,370 J	1,470 J	1,310 J	48,900
Lead	5.2 J	236 J	759	19.8 J	173 J	13.5 J	12.4 J	436
Magnesium	82.7 J	154 J	443 J	54.6 J	298 J	38.5 J	29.9 J	255 J
Manganese	112	132	275	21.5	120	5.6	4.9	270
Mercury	--	0.09	0.65 J	--	--	0.2	0.17	0.18 J
Nickel	--	4 J	17.7	--	5.1 J	--	--	26
Potassium	--	--	180 J	--	--	--	77.6 J	107 J
Selenium	0.15 J	--	--	--	--	0.13 J	--	--
Silver	--	1.2 J	7.1	--	--	4.1	3.6	2.2 J
Sodium	--	137 J	361 J	149. J	124 J	139 J	118 J	189 J
Thallium	--	--	--	--	--	--	--	--
Vanadium	7.3 J	14.9	14.4	28.2	21.8	3.4 J	3.2 J	16.7
Zinc	4.8	155	773	13.1	161	4.1 J	3.4 J	488

See notes at end of table.

Table 5-8 (Continued)
Inorganic Analytes Detected in Site 16 Surface Soil Samples

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Site 16, Open Disposal and Burning Area
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Location Identifier:	16S012	16S013	16S014	16S015	16S016	16S017
Sample Identifier:	16S01201	16S01301	16S01401	16S01501	16S01601	16S01701
Date Sampled:	09-JAN-96	09-JAN-96	10-JAN-96	08-JAN-96	10-JAN-96	10-JAN-96
Laboratory Sample No.:	RA856010	RA856011	RA870003	RA856005	RA870007	RA870006
Inorganic Analytes (mg/kg)						
Aluminum	13,900 J	9,130 J	8,050 J	5,010 J	7,280 J	4,320 J
Antimony	--	--	--	--	--	--
Arsenic	6.6	1.6 J	1.5 J	1.4 J	2.2 J	1.3 J
Barium	39.5 J	12.3 J	19.7 J	7.8 J	10.7 J	6.7 J
Beryllium	0.23 J	0.1 J	0.09 J	0.06 J	--	--
Cadmium	2.1	0.21 J	0.21 J	0.23 J	0.38 J	0.26 J
Calcium	658 J	441 J	670 J	96.5 J	327 J	158 J
Chromium	19.3	8	5.4	3.2	5.5	3.5
Cobalt	1.2 J	0.7 J	0.85 J	--	--	--
Copper	80.1	5.6	6.1	2.9 J	5.4 J	5.8
Cyanide	0.16 J	--	--	0.51 J	--	--
Iron	13,500 J	4,760 J	4,030	2,920 J	5,290	3,070
Lead	128 J	60 J	22.9	4.4 J	15.8	29.6
Magnesium	168 J	142 J	186 J	84.2 J	95.8 J	56.6 J
Manganese	88.1	54.7	372	253	32.3	34.3
Mercury	0.11	--	0.05 J	--	0.06 J	0.06 J
Nickel	5.9 J	--	4.1 J	--	--	2.5 J
Potassium	--	--	69.7 J	--	76.9 J	--
Selenium	0.19 J	--	0.15 J	0.2 J	--	--
Silver	1.3 J	--	--	--	--	--

See notes at end of table.

Table 5-8 (Continued)
Inorganic Analytes Detected in Site 16 Surface Soil Samples

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Site 16, Open Disposal and Burning Area
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Location Identifier:	16S012	16S013	16S014	16S015	16S016	16S017
Sample Identifier:	16S01201	16S01301	16S01401	16S01501	16S01601	16S01701
Date Sampled:	09-JAN-96	09-JAN-96	10-JAN-96	08-JAN-96	10-JAN-96	10-JAN-96
Laboratory Sample No.:	RA856010	RA856011	RA870003	RA856005	RA870007	RA870006
Inorganic Analytes (mg/kg) (Continued)						
Sodium	145 J	117 J	181 J	114 J	186 J	170 J
Thallium	--	--	--	--	--	--
Vanadium	26.5	14	11.2	7 J	13.3	7.3 J
Zinc	177	16.3	8	4.7	16.7	14.7

Notes: mg/kg = milligrams per kilogram.
J = estimated value.
-- = analyte not detected.

Table 5-9
Comparison of Analytes Detected in Background Surface Soil Samples for the Troup Loamy Sand and Lakeland Sand

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Detection Limits	Range of Detected Concentrations[2]	Mean of Detected Concentrations[3]	Background Screening Values[4]	USEPA Region III RBCs Residential/ Industrial[5]	Soil Cleanup Target Levels for Florida Residential/ Industrial/Leachability[6]
Volatile Organic Compounds (µg/kg)							
None detected							
Semivolatile Organic Compounds (µg/kg)							
None detected							
Pesticides and PCBs (µg/kg)							
none detected							
Inorganic Compounds (mg/kg)							
Aluminum	11/11	40 to 40	2,510 to 21,300	6,750	13,500	[8]7,800/200,000	72,000/--/SPLP[10]
Antimony	2/11	2.6 to 12	2.9 to 5	4	8	[8]3.1/82	26/240/5
Arsenic	11/11	2 to 2	0.655* to 3.7	1.3	2.6	[7]0.43/3.8	0.8/4.62/29
Barium	11/11	40 to 40	2.7 to 26.2	9.4	18.8	[8]550/14,000	110/87,000/1,600
Beryllium	5/11	0.05 to 1	0.05 to 0.35	0.18	0.36	[7]16/410	120/800/63
Cadmium	3/11	0.58 to 1	0.22 to 0.9	0.49	0.98	[8]3.9/100	75/1,300/8
Calcium	11/11	1,000 to 1,000	82 to 401	223	446	--/--	--/--/--
Chromium	11/11	2 to 2	2.4 to 16.3	5	10	[8]23/610	210/420/38
Cobalt	8/11	0.33 to 10	0.75 to 3*	1.4	2.8	[8]470/12,000	4,700/110,000/SPLP[10]
Copper	9/11	5 to 5	2.1 to 8.5	4	8	[8]310/8,200	110/76,000/SPLP[10]
Iron	11/11	20 to 20	2,225* to 12,400	3,872	7,744	[8]2,300/61,000	23,000/480,000/SPLP[10]
Lead	11/11	0.6 to 1	1.8 to 9.8	5.1	10.2	[9]400	400/920/SPLP[10]
Magnesium	11/11	1,000 to 1,000	62.85* to 316	122	244	--/--	--/--/--
Manganese	11/11	3 to 3	20.8* to 314	162	324	[8]160/4,100	1,600/22,000/SPLP[10]
Mercury	4/11	0.03 to 0.1	0.04 to 0.07	0.06	0.12	[8]2.3/61	3/26/2.1
Nickel	4/11	2.3 to 8	1.7 to 5.9	3.4	6.8	[8]160/4,100	110/28,000/130
Potassium	3/11	128 to 1,000	81.3* to 96.8	88.5	177	--/--	--/--/--

See notes at end of table.

Table 5-9 (Continued)
Comparison of Analytes Detected in Background Surface Soil Samples for the Troup Loamy Sand and Lakeland Sand

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Site 16, Open Disposal and Burning Area
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Analyte	Frequency of Detection[1]	Range of Detection Limits	Range of Detected Concentrations[2]	Mean of Detected Concentrations[3]	Background Screening Values[4]	USEPA Region III RBCs Residential/ Industrial[5]	Soil Cleanup Target Levels for Florida Residential/ Industrial/Leachability[6]
Inorganic Analytes (mg/kg) (Continued)							
Selenium	5/11	0.39 to 1	0.15* to 0.4	0.23	0.46	[8]39/1,000	390/10,000/5
Silver	1/11	0.32 to 2	0.35 to 0.35	0.35	0.70	[8]39/1,000	390/9,100/17
Sodium	11/11	1,000 to 1,000	143 to 265*	191	382	--/--	--/--/--
Thallium	1/11	0.44 to 2	0.58* to 0.58*	0.58	1.16	[8]5.5/14	--/--/--
Vanadium	11/11	10 to 10	4.95* to 31.1	9.5	19	[8]55/1,400	15/7,400/980
Zinc	10/11	4 to 4	4.3 to 16.3	7.9	15.8	[8]2,300/61,000	23,000/560,000/6,000
Cyanide	1/11	0.23 to 0.5	0.14 to 0.14	0.14	0.28	[8]160/4,100	30/28,000/40

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] Value indicated by an asterisk is the average of a sample and its duplicate. If the target analyte is not detected in either the environmental sample or associated duplicate, the value used for the nondetection is one-half the reporting limit.
[3] The mean of detected concentrations is the arithmetic mean of all environmental samples in which the analyte was detected; it includes a single value for an environmental sample and associated duplicate. The arithmetic mean does not include those environmental samples in which the analyte was not detected.
[4] The background screening value for organics is the mean detected concentration and will not be used for screening purposes in the risk assessment. The background screening value for inorganics is two times the mean detected background concentration and will be used for screening purposes in the risk assessment.
[5] Source: USEPA Region III RBC Table (October 1, 1998).
[6] Source: Soil Cleanup Target Levels for Chapter 62-777, Florida Administrative Code (FDEP, 1999).
[7] The values correspond to a human cancer risk level of 1 in 1,000,000.
[8] The calculated values correspond to a noncancer hazard quotient of 0.1.
[9] Office of Solid Waste and Emergency Response Directive No. 9355.4-12, Revised Interim Recommended Soil Cleanup for CERCLA and RCRA Sites (USEPA, 1994c).
[10] Leachability values may be derived using the SPLP test to calculate site-specific soil cleanup target levels or may be determined using the toxicity characteristic leaching procedure in the event oily wastes are present.
[11] FDEP-approved site-specific soil cleanup target level for arsenic at covered landfill sites (Appendix K).

Notes: USEPA = U.S. Environmental Protection Agency.
RBC = risk-based concentration.
TCL = target compound list.
μg/kg = micrograms per kilogram.
PCB = polychlorinated biphenyl.
mg/kg = milligrams per kilogram.
-- = criteria not available.

Table 5-10
Summary of Organic Compounds Detected in Site 16 Surface Soil Samples

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Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limits Range	Detected Concentrations Range[2]	Mean of Detected Concentrations[3]	Background Screening Values[4]	USEPA Region III RBCs Residential/ Industrial[5]	Soil Cleanup Target Levels for Florida Residential/ Industrial/Leachability[6]
Volatile Organic Compounds (μg/kg)							
Toluene	1/20	6 to 13	1	1	ND	[8]1,600,000/41,000,000	380,000/2,600,000/500
Xylenes (total)	3/20	6 to 13	1 to 5	2.7	ND	[8]16,000,000/410,000,000	5,900,000/40,000,000/200
Semivolatile Organic Compounds (μg/kg)							
Anthracene	1/20	350 to 420	95	95	ND	[8]2,300,000/61,000,000	18,000,000/260,000,000/2,500,000
Benzo(a)anthracene	4/20	350 to 420	56 to 2,300	668	ND	[7]870/7,800	1,400/5,000/3,200
Benzo(a)pyrene	5/20	350 to 840	71 to 3,100	746	ND	[7]87/780	100/500/8,000
Benzo(b)fluoranthene	4/20	350 to 840	86 to 3,600	1,084	ND	[7]870/7,800	1,400/4,800/10,000
Benzo(g,h,i)perylene	3/20	350 to 420	120 to 1,200	603	ND	--/--	2,300,000/41,000,000/32,000,000
Benzo(k)fluoranthene	3/20	350 to 420	73 to 3,200	1,204	ND	[7]8,700/78,000	15,000/52,000/25,000
Carbazole	1/17	350 to 420	97	97	ND	[7]32,000/290,000	53,000/190,000/600
Chrysene	5/20	350 to 420	54 to 3,200	741	ND	[7]87,000/780,000	140,000/450,000/77,000
Dibenzo(a,h)anthracene	2/20	350 to 420	110 to 700	405	ND	[7]87/780	100/500/30,000
Fluoranthene	4/20	350 to 420	59 to 2,300	676	ND	[8]310,000/8,200,000	2,900,000/48,000,000/1,200,000
Indeno(1,2,3-cd)pyrene	4/20	350 to 420	62 to 1,900	573	ND	[7]870/7,800	1,500/5,300/28,000
Phenanthrene	2/20	350 to 420	52 to 440	246	ND	--/--	2,000,000/30,000,000/250,000
Pyrene	4/20	350 to 420	44 to 1,700	516	ND	[8]230,000/6,100,000	2,200,000/37,000,000/880,000
bis(2-ethylhexyl)phthalate	7/20	350 to 420	43 to 116.5*	70.1	ND	[7]46,000/410,000	76,000/280,000/3,600,000
Pesticides and PCBs (μg/kg)							
4,4'-DDD	2/20	3.6 to 21	2.1 to 18	10.1	ND	[7]2,700/24,000	4,600/18,000/4,000
4,4'-DDE	9/20	3.6 to 21	2.6* to 100	30.2	ND	[7]1,900/17,000	3,300/13,000/18,000
4,4'-DDT	9/20	3.6 to 21	3.25* to 89	20.8	ND	[7]1,900/17,000	3,300/13,000/11,000

See notes at end of table.

Table 5-10 (Continued)
Summary of Organic Compounds Detected in Site 16 Surface Soil Samples

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Analyte	Frequency of Detection[1]	Reporting Limits Range	Detected Concentrations Range[2]	Mean of Detected Concentrations[3]	Background Screening Values[4]	USEPA Region III RBCs Residential/ Industrial[5]	Soil Cleanup Target Levels for Florida Residential/ Industrial/Leachability[6]
Pesticides and PCBs (µg/kg) (Continued)					ND		
Dieldrin	8/20	3.6 to 21	2.5 to 130	31	ND	[7]40/360	70/300/4
alpha-Chlordane	3/20	1.8 to 99	1.6 to 9.4*	4.5	ND	[7]1,800/14,000	3,100/12,000/9,600
gamma-Chlordane	3/20	1.8 to 99	1 to 5.95*	3.1	ND	[7]1,800/14,000	3,100/12,000/9,600
Aroclor-1254	2/20	36 to 210	36 to 130	83	ND	[7]320/2,900	500/2,100/17,000
Aroclor-1260	1/20	36 to 210	79*	79	ND	[7]320/2,900	500/2,100/17,000

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] Value indicated by an asterisk is the average of a sample and its duplicate. If the target analyte is not detected in either the environmental sample or associated duplicate, the value used for the nondetection is one-half the reporting limit.
[3] The mean of detected concentrations is the arithmetic mean of all environmental samples in which the analyte was detected; it includes a single value for an environmental sample and associated duplicate. The arithmetic mean does not include those environmental samples in which the analyte was not detected.
[4] The background screening value for organics is the mean detected concentration and will not be used for screening purposes in the risk assessment. The background screening value for inorganics is two times the mean detected background concentration and will be used for screening purposes in the risk assessment.
[5] Source: USEPA Region III RBC Table (October 1, 1998).
[6] Source: Soil Cleanup Target Levels for Chapter 62-777, Florida Administrative Code (FDEP, 1999).
[7] Values correspond to a human cancer risk level of 1 in 1,000,000.
[8] Values correspond to a noncancer hazard quotient of 0.1.

Notes: USEPA = U.S. Environmental Protection Agency.
RBC = risk-based concentration.
µg/kg = micrograms per kilogram.
Bold indicates analyte exceeded cleanup target level.
ND = not detected.
* = average of a sample and its duplicate.
-- = criteria not available.
PCB = polychlorinated biphenyl.
DDD = dichlorodiphenyldichloroethene.
DDE = dichlorodiphenyltrichloroethene.
DDT = dichlorodiphenyltrichloroethane.

Table 5-11
Summary of Inorganic Analytes Detected in Site 16 Surface Soil Samples

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Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limits Range	Detected Concentrations Range[2]	Mean of Detected Concentrations[3]	Background Screening Values[4]	USEPA Region III RBCs Residential/ Industrial[5]	Soil Cleanup Target Levels for Florida Residential/ Industrial/Leachability[6]
Inorganic Compounds (mg/kg)							
Aluminum	20/20	40	1,890* to 18,600	8,724	15,848	[8]7,800/200,000	72,000/--/SPLP[10]
Antimony	1/20	2.7 to 12	5.9	5.9	8	[8]3.1/82	26/240/5
Arsenic	20/20	2	0.7* to 12.1	2.8	3.2	[7]0.43/3.8	0.8/[11]4.62/29
Barium	20/20	40	4.45* to 257	36.8	23.2	[8]550/14,000	110/87,000/1,600
Beryllium	15/20	1	0.06 to 0.295*	0.12	0.36	[7]16/410	120/800/63
Cadmium	17/20	0.61 to 1	0.21 to 7.6	1.3	0.58	[8]3.9/100	75/1,300/8
Calcium	20/20	1,000	70.8 to 2,350	584	396	--/--	--/--/--
Chromium	20/20	2	3.2 to 29.2	10.6	11	[8]23/610	210/420/38
Cobalt	11/20	10	0.69 to 4.1	1.7	3	[8]470/12,000	4,700/110,000/SPLP[10]
Copper	19/20	5	2.9 to 202	34.1	9.4	[8]310/8,200	110/76,000/SPLP[10]
Iron	20/20	20	1,390* to 48,900	9,240	8,832	[8]2,300/61,000	23,000/480,000/SPLP[10]
Lead	20/20	0.6 to 1	4.4 to 759	110	11.4	[9]400	400/920/SPLP[10]
Magnesium	20/20	1,000	34.2* to 443	157	268	--/--	--/--/--
Manganese	20/20	3	5.25* to 372	129	392	[8]160/4,100	1,600/22,000/SPLP[10]
Mercury	9/20	0.08 to 0.1	0.05 to 0.65	0.17	0.12	[8]2.3/61	3.4/26/2.1
Nickel	11/20	2.4 to 8	2.3 to 26	7.2	7.2	[8]160/4,100	110/28,000/130
Potassium	6/20	133 to 1,000	69.7 to 288.8*	159	177	--/--	--/--/--
Selenium	7/20	0.41 to 1	0.15 to 0.345*	0.21	0.46	[8]39/1,000	390/10,000/5
Silver	6/20	0.33 to 2	0.87 to 7.1	2.8	0.70	[8]39/1,000	390/9,100/17
Sodium	18/20	1,000	114 to 361	178	406	--/--	--/--/--
Thallium	2/20	0.46 to 2	0.13 to 0.18	0.16	1.16	[8]5.5/14	--/--/--
Vanadium	20/20	10	3.3* to 28.9	15.8	21.8	[8]55/1,400	15/7,400/980
Zinc	20/20	4	3.75* to 773	104	15.4	[8]2,300/61,000	23,000/560,000/6,000
Cyanide	8/20	0.24 to 0.5	0.12* to 0.51	0.2	0.28	[8]160/4,100	30/28,000/40

See notes at end of table.

Table 5-11 (Continued)
Summary of Inorganic Analytes Detected in Site 16 Surface Soil Samples

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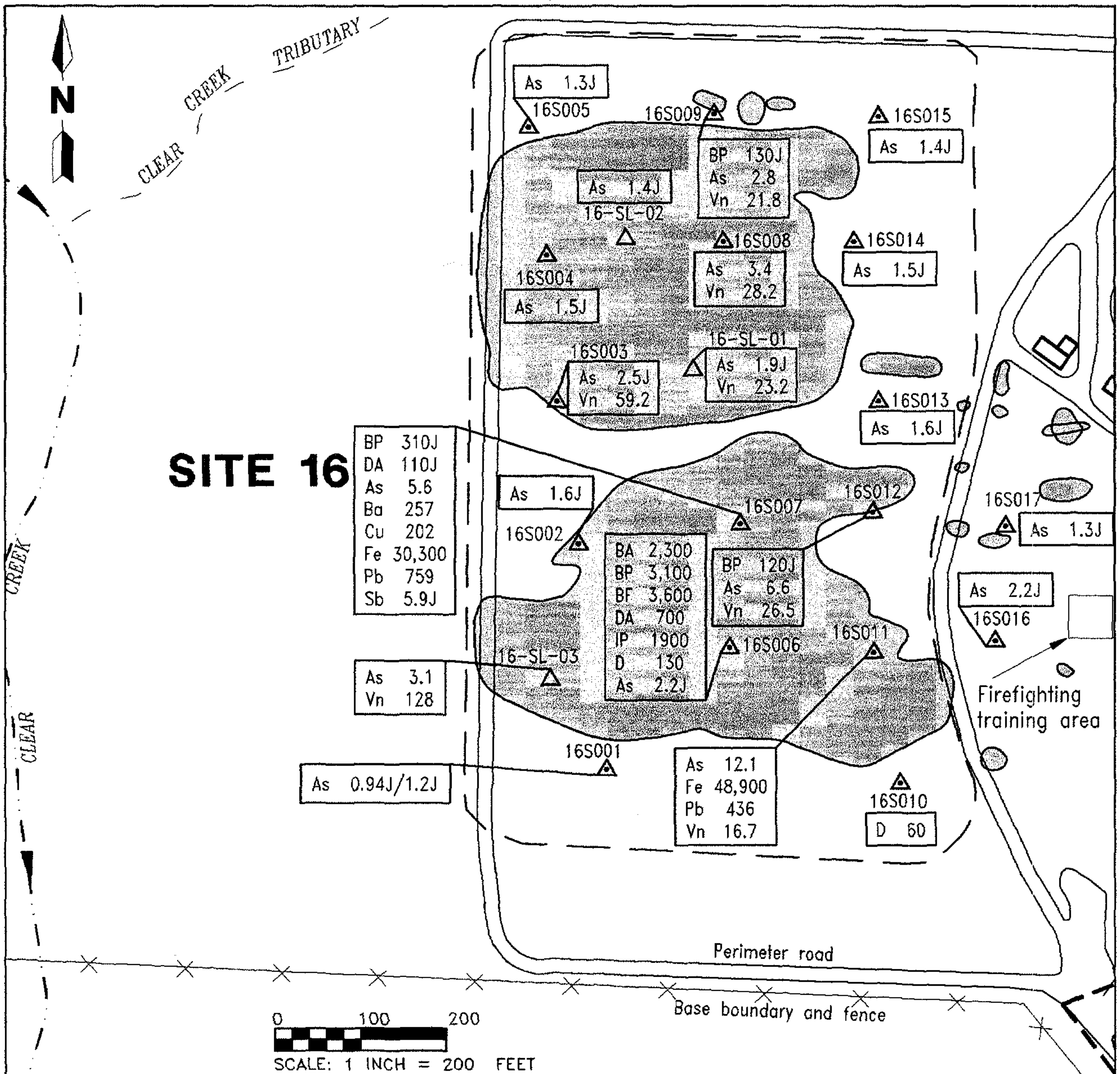
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] Value indicated by an asterisk is the average of a sample and its duplicate. If the target analyte is not detected in either the environmental sample or associated duplicate, the value used for the nondetection is one-half the reporting limit.
[3] The mean of detected concentrations is the arithmetic mean of all environmental samples in which the analyte was detected; it includes a single value for an environmental sample and associated duplicate. The arithmetic mean does not include those environmental samples in which the analyte was not detected.
[4] The background screening value for organics is the mean detected concentration and will not be used for screening purposes in the risk assessment. The background screening value for inorganics is two times the mean detected background concentration and will be used for screening purposes in the risk assessment.
[5] USEPA Region III RBC Table (October 1, 1998).
[6] Soil Cleanup Target Levels for Chapter 62-777, Florida Administrative Code (FDEP, 1999).
[7] The values correspond to a human cancer risk level of 1 in 1,000,000.
[8] The calculated values correspond to a noncancer hazard quotient of 0.1.
[9] Office of Solid Waste and Emergency Response Directive No. 9355.4-12, Revised Interim Recommended Soil Cleanup for CERCLA and RCRA Sites (USEPA, 1994c).
[10] Leachability values may be derived using the SPLP test to calculate site-specific soil cleanup target levels or may be determined using the toxicity characteristic leaching procedure in the event oily wastes are present.
[11] FDEP-approved site-specific soil cleanup target level for arsenic at covered landfill sites (Appendix K).

Notes: USEPA = U.S. Environmental Protection Agency.
RBC = risk-based concentration.
mg/kg = milligrams per kilogram.
Bold = indicates analyte exceeded cleanup target level.
* = average of a sample and its duplicate.
-- = criteria not available.



NOTE: Only compunds with detections above FDEP Cleanup Target Levels are shown.

LEGEND

BA Benzo(a)anthracene
BP Benzo(a)pyrene
BF Benzo(b)fluoranthene
DA Dibenzo(a,h)anthranene
IP Indeno(1,2,3-cd)pyrene
Sb Antimony

As Arsenic
Ba Barium
Cu Copper
Fe Iron
Pb Lead
Vn Vanadium
Interpreted landfill/disposal area

Approximate site boundary
16-SL-01 Remedial investigation Phase IIA surface soil sample location and designation
16S013 Remedial investigation Phase IIB surface soil sample location and designation

FIGURE 5-11
ANALYTICAL RESULTS
SURFACE SOIL SAMPLES

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SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

The Florida residential SCTL for benzo(a)pyrene was exceeded in four samples: 16S00601, 16S00701, 16S00901, and 16S01201. Benzo(b)fluoranthene exceeded the residential SCTL for Florida (1,400 μg/kg) in one sample: 16S00601. Dibenzo(a,h)anthracene exceeded the residential SCTL for Florida (100 μg/ℓ) in two samples: 16S00601 and 16S00701.

Benzo(a)pyrene was detected in sample 16S00601 at a concentration of 3,100 μg/kg, exceeding the industrial cleanup target level for Florida of 500 μg/kg.

The Region III residential RBC for benzo(a)pyrene was exceeded in three samples: 16S00601, 16S00701, and 16S00901.

Benzo(b)fluoranthene exceeded Region III residential RBC (870 μg/kg) in one sample 16S00601 (3,600 μg/kg). Dibenzo(a,h)anthracene exceeded the Region III residential RBC (87 μg/kg) in two samples, 16S00601 and 16S00701, which had concentrations of 700 and 110 μg/kg, respectively.

Benzo(a)pyrene exceeded the Region III industrial RBC (780 μg/kg) in sample 16S00601 with a concentration of 3,100 μg/kg.

<u>Pesticides and PCBs</u>. Six pesticides (dieldrin, alpha-chlordane, gamma-chlordane, 4,4'-dichlorodiphenyldichloroethene [4,4'-DDE], 4,4'dichlorodiphenyldichloroe-thane [4,4'-DDD], and 4,4'-dichlorodiphenyltrichloroethane [4,4'-DDT] and two PCBs [Aroclor-1254 and Aroclor-1260]) were detected in one or more surface soil samples collected at Site 16.

Dieldrin was detected in sample 16S00601 at a concentrations of 130 μg/kg, which exceeds the Florida residential SCTL (70 μg/kg) and leachability SCTL (4 μg/kg). Dieldrin was also detected in sample 16S00601 and the duplicate of 16S01001 at concentrations (130 and 60 μg/kg, respectively) that exceed the USEPA Region III residential RBC (40 μg/kg). No other pesticides or PCBs were detected at concentrations that exceeded either Florida or Federal SCTLs.

<u>Inorganics and Cyanide</u>. Twenty-three inorganic analytes and cyanide were detected in the surface soil samples collected at Site 16 (Table 5-8). Eighteen analytes (aluminum, arsenic, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, mercury, nickel, potassium, silver, vanadium, zinc, and cyanide) exceeded the background screening values in some samples (Table 5-11). Arsenic is the only inorganic analyte that exceeded the residential and industrial values for the SCTLs for Florida and USEPA Region III RBCs.

Arsenic exceeded the Florida residential SCTL (0.8 milligrams per kilogram [mg/kg]) in 19 samples and 2 duplicates (16-SL-01 through 16-SL-03 and 16S00101 through 16S01701) with concentrations ranging from 0.94 to 12.1 mg/kg. Arsenic also exceeded the site-specific cleanup target level (4.62 mg/kg) in two samples (16S01101 and 16S01201) with concentrations of 12.1 to 6.6 mg/kg, respectively.

Iron exceeded the Florida residential SCTL (23,000 mg/kg) in sample 16S01101 with a concentration of 48,900 mg/kg.

Lead exceeded the Florida residential SCTL (400 mg/kg) in sample 16S01101 with a concentration of 436 mg/kg and sample 16S00701 at 759 mg/kg.

Arsenic and lead also exceeded the residential values for USEPA Region III RBCs.

Arsenic exceeded the USEPA Region III residential RBC (0.43 mg/kg) in samples 16-SL-01 through 16-SL-03, 16S00101 and 16S01701, with concentrations ranging from 0.64 to 12.1 mg/kg. Beryllium exceeded the USEPA Region III residential RBC (0.2 mg/kg) in sample 16S01201 with a concentration of 0.23 mg/kg.

Arsenic also exceeded the USEPA Region III industrial RBC (3.8 mg/kg) in samples 16S01101 and 16S01201 with concentrations of 12.1 and 6.6 mg/kg, respectively.

Barium, copper, and vanadium were also detected at concentrations above Florida residential SCTLs. Antimony was detected in one sample (16S00701) above the Florida leachability SCTL.

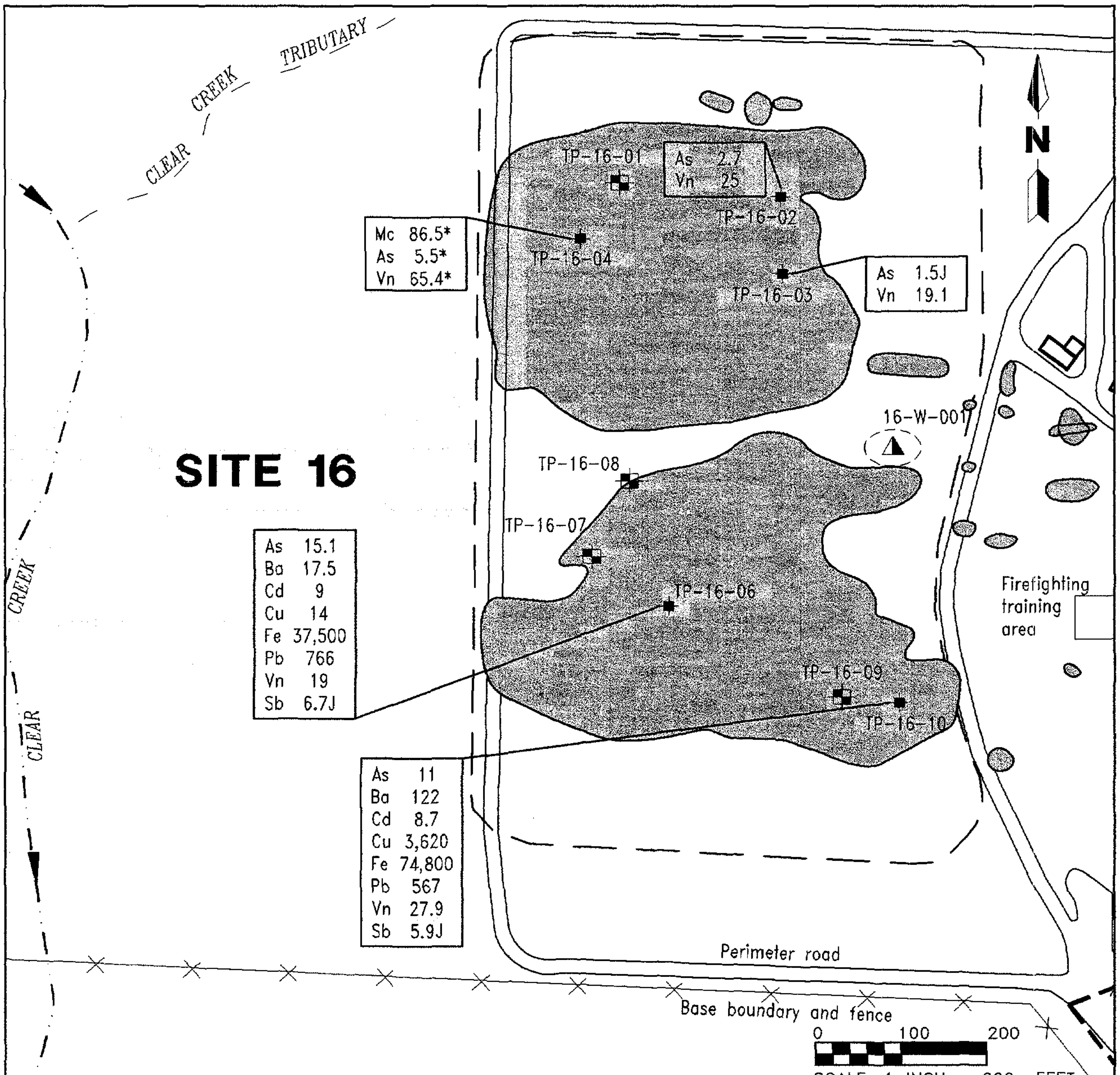
5.6 SUBSURFACE SOIL RESULTS. Five subsurface soil samples and one duplicate sample were collected from within 10 excavated test pits (Figure 5-12). Samples 16SS0201, 16SS0302, 16SS0403 and its duplicate sample 16SS0403A, 16-SS-06-04, and 16-SS-10-05 were collected from depths ranging from 2 to 10.5 feet bls. Tables 5-12 and 5-13 summarize the analytical results for organic and inorganic analytes detected in these five subsurface soil samples respectively. Tables 5-14 and 5-15 summarize the frequency of detection of organic and inorganic analytes detected, as well as the range of detection limits, range of detection concentrations, and mean of detection concentrations, comparison to background screening values, USEPA Region III RBCs for industrial screening criteria (USEPA, 1998), and Florida SCTLs (FDEP, 1999). Figure 5-12 presents the analytical results which exceeded SCTLs.

Organic compounds detected in subsurface soil samples consist of 7 VOCs, 11 SVOCs, and 4 pesticides. The organic compounds detected in Site 16 subsurface soil samples did not exceed the SCTLs for Florida (with the exception of methylene chloride) or the USEPA Region III RBCs.

VOCs. 2-Butanone, acetone, carbon disulfide, ethylbenzene, methylene chloride, toluene, and xylenes were detected in one or more subsurface soil samples collected at Site 16. The detected concentrations of these VOCs (except methylene chloride) are below their respective industrial values of the soil SCTLs for Florida and USEPA Region III RBCs. Methylene chloride was detected in one sample (16SS0403) above the Florida leachability SCTL.

SVOCs. 2-Methylnaphthalene, acenaphthene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene, and bis(2-ethylhexyl)phthalate were detected in one or more subsurface soil samples collected at Site 16. The detected concentrations of these SVOCs are below their respective industrial values of the SCTLs for Florida and USEPA Region III RBCs.

Pesticides and PCBs. 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and dieldrin were detected in one or more subsurface soil samples collected at Site 16. The detected concentrations of these pesticides are below their respective industrial values of the SCTLs for Florida and USEPA Region III RBCs. No PCBs were detected in the subsurface soil samples collected at Site 16.



NOTE: Only compunds with detections above FDEP Cleanup Target Levels are shown.

LEGEND

Mc Methylene chloride
As Arsenic
Ba Barium
Cd Cadmium
Cu Copper
Fe Iron
Pb Lead
Sb Antimony
Vn Vanadium
FDEP Florida Department of Environmental Protection
* Average of sample and duplicate
Interpreted landfill/disposal area
Approximate site boundary
Flow direction
Approximate location of ephemeral wetland
16-W-001 Surface water sample location and designation
TP-16-04 Remedial investigation Phase IIA subsurface soil sample location and designation
TP-16-07 Test pit location and designation

FIGURE 5-12
SUBSURFACE SOIL, TEST PIT, AND SURFACE WATER SAMPLE LOCATIONS

REMEDIAL INVESTIGATION REPORT SITE 16, OPEN DISPOSAL AND BURNING AREA

NAVAL AIR STATION WHITING FIELD MILTON, FLORIDA

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Table 5-12
Organic Analytes Detected in Site 16 Subsurface Soil Samples

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Location Identifier:	TP-16-06	TP-16-10	TP-16-02	TP-16-03	TP-16-04	TP-16-04 DUP
Sample Identifier:	16-SS-06-04	16-SS-10-05	16SS0201	16SS0302	16SS0403	16SS0403A
Date Sampled:	05-OCT-92	06-OCT-92	04-OCT-92	04-OCT-92	05-OCT-92	05-OCT-92
Laboratory Sample No.:	22910001	22910004	22891006	22897001	22898001	22898001
Sample Depths (feet bls):	10.5	2	2 to 3.5	6 to 8	9 to 10	9 to 10
Volatile Organic Compounds (µg/kg)						
2-Butanone	19	--	--	--	--	--
Acetone	87 J	--	--	--	--	--
Carbon disulfide	1 J	5 J	26	5 J	13	9 J
Ethylbenzene	--	--	--	--	2 J	--
Methylene chloride	--	--	--	--	150 J	--
Toluene	--	--	1 J	--	--	--
Xylenes (total)	2 J	4 J	11 J	3 J	7 J	5 J
Semivolatile Organic Compounds (µg/kg)						
2-Methylnaphthalene	--	--	39 J	--	--	--
Acenaphthene	77 J	--	--	--	--	--
Benzo(a)pyrene	44 J	--	--	--	--	--
Benzo(b)fluoranthene	77 J	--	--	--	--	--
Benzo(k)fluoranthene	48 J	--	--	--	--	--
Fluoranthene	270 J	--	120 J	--	--	--
Fluorene	110 J	--	--	--	--	--
Naphthalene	--	--	39 J	--	--	--
Phenanthrene	340 J	--	58 J	--	--	--
Pyrene	190 J	--	77 J	--	--	--
bis(2-Ethylhexyl)phthalate	150 J	39 J	--	--	--	--
Pesticides and PCBs (µg/kg)						
4,4'-DDD	36 J	4.9 J	2.2 J	--	--	--
4,4'-DDE	30 J	83	1.8 J	--	--	--
4,4'-DDT	5.7 J	52	--	--	--	--
Dieldrin	--	--	1.6 J	--	--	--

Notes: DUP = duplicate sample.
bls = below land surface.
µg/kg = micrograms per kilogram.
-- = not detected.
J = estimated value.
PCB = polychlorinated biphenyl.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyltrichloroethane.

Table 5-13
Inorganic Analytes Detected in Site 16 Subsurface Soil Samples

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Location Identifier:	TP-16-06	TP-16-10	TP-16-02	TP-16-03	TP-16-04	TP-16-04 DUP
Sample Identifier:	16-SS-06-04	16-SS-10-05	16SS0201	16SS0302	16SS0403	16SS0403A
Date Sampled:	05-OCT-92	06-OCT-92	04-OCT-92	04-OCT-92	05-OCT-92	05-OCT-92
Laboratory Sample No.:	22910001	22910004	22891006	22897001	22898001	22898001
Sample Depth (feet bls):	10.5	2	2 to 3.5	6 to 8	9 to 10	9 to 10
Inorganic Analytes (mg/kg)						
Aluminum	11,000	17,300	17,000	15,400	29,000	19,500
Antimony	6.7 J	5.9 J	2.5 J	--	--	--
Arsenic	15.1	11	2.7	1.5 J	5.1 J	5.8 J
Barium	175	122	36 J	35 J	21 J	19 J
Beryllium	0.19 J	0.19 J	0.18 J	0.21 J	0.23 J	0.29 J
Cadmium	9	8.7	2.4 J	--	--	--
Calcium	5,870	1,370	877 J	254 J	--	--
Chromium	24.7	36.9	16.6	10.5	32.5 J	27.3 J
Cobalt	4.5 J	9.6 J	1.1 J	1.2 J	2.4 J	1.4 J
Copper	143	3,620	16.2	4.8 J	13.7	7.9
Cyanide	--	0.14 J	--	--	NA	NA
Iron	37,500	74,800	8,440	6,670	21,700	17,600
Lead	766	567	74.6	6.8	17.3 J	14.6 J
Magnesium	586 J	400 J	243 J	293 J	211 J	185 J
Manganese	297	638	93.1	231	54	39.9
Mercury	0.25 J	0.17 J	0.29 J	0.43 J	--	--
Nickel	24.3	35.9	4.4 J	4.4 J	4.4 J	2.3 J
Potassium	412 J	166 J	258 J	--	270 J	356 J
Silver	4.3	3.4	0.79 J	--	--	--
Sodium	514 J	332 J	243 J	207 J	--	--
Vanadium	19	27.9	25	19.1	63.3	67.5
Zinc	518	895	122	10.6 J	43 J	28 J

Notes: DUP = duplicate sample.
bls = below land surface.
mg/kg = milligrams per kilogram.
J = estimated value.
-- = not detected.
NA = not analyzed.

Table 5-14
Summary of Organic Compounds Detected in Site 16 Subsurface Soil Samples

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Detection Limits	Range of Detected Concentrations[2]	Mean of Detected Concentrations[3]	Background Screening Values[4]	USEPA Region III RBCs Industrial[5]	Soil Cleanup Target Levels for Florida Residential/Industrial/Leachability[6]
Volatile Organic Compounds (µg/kg)							
2-Butanone	1/5	11 to 12	19	19	ND	[7]120,000,000	3,100,000/21,000,000/17,000
Acetone	1/5	11 to 145	87	87	ND	[7]20,000,000	780,000/5,500,000/2,800
Carbon disulfide	5/5	11 to 12	1 to 26	9.6	ND	[7]20,000,000	200,000/1,400,000/5,600
Ethylbenzene	1/5	11 to 12	1*	1	ND	[7]20,000,000	1,100,000/8,400,000/600
Methylene chloride	1/5	19 to 120	86.5*	86.5	ND	[8]760,000	16,000/23,000/20
Toluene	1/5	11 to 12	1	1	ND	[7]41,000,000	380,000/2,600,000/500
Xylenes (total)	5/5	11 to 12	2 to 11	5.2	ND	[7]410,000,000	5,900,000/40,000,000/200
Semivolatile Organic Compounds (µg/kg)							
2-Methylnaphthalene	1/5	370 to 415	39	39	ND	[7]4,100,000	80,000/560,000/6,100
Acenaphthene	1/5	370 to 415	77	77	ND	[7]12,000,000	1,900,000/18,000,000/2,100
Benzo(a)pyrene	1/5	370 to 415	44	44	ND	[8]780	100/500/8,000
Benzo(b)fluoranthene	1/5	370 to 415	77	77	ND	[8]7,800	1,400/4,800/10,000
Benzo(k)fluoranthene	1/5	370 to 415	48	48	ND	[8]78,000	15,000/52,000/25,000
Fluoranthene	2/5	370 to 415	120 to 270	195	ND	[7]8,200,000	2,900,000/48,000,000/1,200,000
Fluorene	1/5	370 to 415	110	110	ND	[7]8,200,000	2,200,000/28,000,000/160,000
Naphthalene	1/5	370 to 415	39	39	ND	[7]4,100,000	40,000/270,000/1,700
Phenanthrene	2/5	370 to 415	58 to 340	199	ND	--	2,000,000/30,000,000/250,000
Pyrene	2/5	370 to 415	77 to 190	134	ND	[7]6,100,000	2,200,000/37,000,000/880,000
bis(2-Ethylhexyl)phthalate	2/5	370 to 415	39 to 150	94.5	ND	[8]410,000	76,000/280,000/3,600,000

See notes at end of table.

Table 5-14 (Continued)
Summary of Organic Compounds Detected in Site 16 Subsurface Soil Samples

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Detection Limits	Range of Detected Concentrations[2]	Mean of Detected Concentrations[3]	Background Screening Values[4]	USEPA Region III RBCs Industrial[5]	Soil Cleanup Target Levels for Florida Residential/Industrial/Leachability[6]
Pesticides and PCBs (μg/kg)							
4,4'-DDD	3/5	3.7 to 8	2.2 to 36	14.4	ND	[8]24,000	4,600/18,000/4,000
4,4'-DDE	3/5	3.7 to 8	1.8 to 83	38.8	ND	[8]17,000	3,300/13,000/18,000
4,4'-DDT	2/5	3.7 to 8	5.7 to 52	28.9	ND	[8]17,000	3,300/13,000/11,000
Dieldrin	1/5	3.7 to 7.6	1.6	1.6	ND	[8]360	70/300/4

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. If the target analyte is not detected in either the environmental sample or associated duplicate, the value used for the nondetection is one-half the reporting limit.
[3] The mean of detected concentrations is the arithmetic mean of all environmental samples in which the analyte was detected; it includes a single value for an environmental sample and associated duplicate. The arithmetic mean does not include those environmental samples in which the analyte was not detected.
[4] The background screening value for organics is the mean detected concentration and will not be used for screening purposes in the risk assessment. The background screening value for inorganics is two times the mean detected background concentration and will be used for screening purposes in the risk assessment.
[5] Source: USEPA Region III RBC Table (October 1, 1998).
[6] Source: Soil Cleanup Target Levels for Chapter 62-777, Florida Administrative Code (FDEP, 1999).
[7] Values correspond to a noncancer hazard quotient of 0.1.
[8] Values correspond to a human cancer risk level of 1 in 1,000,000.

Notes: USEPA = U.S. Environmental Protection Agency.
RBC = risk-based concentration.
μg/kg = micrograms per kilogram.
* = average of a sample and its duplicate.
ND = not detected.
– = criteria not available.
PCB = polychlorinated biphenyl.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyltrichloroethene.
DDT = dichlorodiphenyltrichloroethane.

Table 5-15
Summary of Inorganic Analytes Detected in Site 16 Subsurface Soil Samples

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Detection Limits	Range of Detected Concentrations[2]	Mean of Detected Concentrations[3]	Background Screening Values[4]	USEPA Region III RBCs Industrial[5]	Soil Cleanup Target Levels for Florida Residential/Industrial/Leachability[6]
Inorganic Analytes (mg/kg)							
Aluminum	5/5	40	11,000 to 24,250*	16,990	27,834	[8]200,000	72,000/--/SPLP[11]
Antimony	3/5	2.4 to 12	2.5 to 6.7	5	4.4	[8]82	26/240/5
Arsenic	5/5	2	1.5 to 15.1	7.2	6.2	[7]3.8	0.8/[12]4.62/29
Barium	5/5	40	20 to 175*	77.6	15.8	[8]14,000	110/87,000/1,600
Beryllium	5/5	1	0.18 to 0.26*	0.21	0.26	[7]410	120/800/63
Cadmium	3/5	0.67 to 1	2.4 to 9	6.7	0.92	[8]100	75/1,300/8
Calcium	4/5	510 to 1,000	254 to 5,870	2,093	444	--	--/--/--
Chromium[10]	5/5	2	10.5 to 36.9	23.7	22.8	[8]610	210/400/38
Cobalt	5/5	10	1.1 to 9.6	3.7	1.48	[8]12,000	4,700/110,000/SPLP[11]
Copper	5/5	5	4.8 to 3,620	759	8.8	[8]8,200	110/76,000/SPLP[11]
Iron	5/5	20	6,670 to 74,800	29,412	18,100	[8]61,000	23,000/480,000/SPLP[11]
Lead	5/5	1	6.8 to 766	286	8.4	[9]400	400/920/SPLP[11]
Magnesium	5/5	1,000	198* to 586	344	272	--	--/--/--
Manganese	5/5	3	46.95* to 638	261	42.6	[8]4,100	1,600/22,000/SPLP[11]
Mercury	4/5	0.1 to 0.12	0.17 to 0.43	0.28	ND	[8]61	3.4/26/2.1
Nickel	5/5	8	3.35* to 35.9	14.5	5.0	[8]4,100	110/28,000/130
Potassium	4/5	153 to 1,000	166 to 412	287	181	--	--/--/--
Silver	3/5	0.46 to 2	0.79 to 4.3	2.8	1.12	[8]1,000	390/9,100/17
Sodium	4/5	224 to 1,000	207 to 514	324	NA	--	--/--/--
Vanadium	5/5	10	19 to 65.4*	31.3	45	[8]1,400	15/7,400/980
Zinc	5/5	4	10.6 to 895	316	15.6	[8]61,000	23,000/560,000/6,000
Cyanide	1/4	0.09 to 1	0.14	0.14	ND	[8]4,100	30/28,000/40

See notes at end of table.

Table 5-15 (Continued)
Summary of Inorganic Analytes Detected in Site 16 Subsurface Soil Samples

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] If the target analyte is not detected in either the environmental sample or associated duplicate, the value used for the nondetection is one-half the reporting limit.
[3] The mean of detected concentrations is the arithmetic mean of all environmental samples in which the analyte was detected; it includes a single value for an environmental sample and associated duplicate. The arithmetic mean does not include those environmental samples in which the analyte was not detected.
[4] The background screening value for organics is the mean detected concentration and will not be used for screening purposes in the risk assessment. The background screening value for inorganics is two times the mean detected background concentration and will be used for screening purposes in the risk assessment.
[5] Source: USEPA Region III RBC Table (October 1, 1998).
[6] Source: Soil Cleanup Target Levels for Chapter 62-777, Florida Administrative Code (Florida Department of Environmental Protection [FDEP], 1999).
[7] The values correspond to a human cancer risk level of 1 in 1,000,000.
[8] The calculated values correspond to a noncancer hazard quotient of 0.1.
[9] Office of Solid Waste and Emergency Response Directive No. 9355.4-12, Revised Interim Recommended Soil Cleanup for CERCLA and RCRA sites (USEPA, 1994c).
[10] Values based on hexavalent form of chromium.
[11] Leachability values may be derived using the SPLP test to calculate site-specific soil cleanup target levels or may be determined using the toxicity characteristic leaching procedure in the event oily wastes are present.
[12] FDEP-approved site-specific soil cleanup target level for arsenic at covered landfill sites (Appendix K).

Notes: USEPA = U.S. Environmental Protection Agency.
RBC = risk-based concentration.
mg/kg = milligrams per kilogram.
* = average of sample and duplicate.
Bold indicates analyte exceeded cleanup target level.
-- = criteria not available.
ND = not detected.

Inorganics and Cyanide. Twenty-one inorganic analytes and cyanide were detected in the five subsurface soil samples. Twenty analytes (antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, potassium, silver, sodium, vanadium, zinc, and cyanide) exceeded the background screening values in some samples (Table 5-15). Arsenic concentrations exceeded the industrial values of the SCTLs for Florida and the USEPA Region III RBCs. Lead concentrations exceeded the USEPA Region III residential RBC.

Arsenic was detected in all five subsurface soil samples at concentrations ranging from 1.5 to 15.1 mg/kg. Three of the five environmental samples and the duplicate sample exceeded the site-specific cleanup target level (4.62 mg/kg) and the USEPA Region III industrial RBC (3.8 mg/kg).

Lead was detected in all five samples at concentrations ranging from 6.8 to 766 mg/kg. Lead concentrations exceeded the USEPA Region III residential RBC (400 mg/kg) in two samples (16-SS-06-04 at 766 mg/kg and 16-SS-10-05 at 567 mg/kg).

Barium, copper, iron, and vanadium were also detected at concentrations above the Florida residential SCTL. Antimony and beryllium were detected at levels above the Florida leachability SCTL.

5.7 SURFACE WATER RESULTS. The surface water assessment at Site 16 consisted of collecting one surface water sample (16W00101) from the ephemeral pond located on the site (Figure 5-12). Table 5-16 presents the organic and inorganic analytical results for the surface water sample collected during Phase IIB and provides a comparison to the Florida Class III fresh surface water criteria (Chapter 62-302.530, FAC) and Florida Groundwater Cleanup Levels (GCTL) (per FDEP policy) (FDEP, 1999).

No VOCs, SVOCs, pesticides, or PCBs were detected in the surface water sample collected at Site 16.

Inorganic Analytes. Eleven inorganic analytes (aluminum, barium, beryllium, calcium, iron, lead, magnesium, manganese, potassium, sodium, and zinc) were detected in the surface water sample collected at Site 16 (Table 5-16). The inorganic analyte beryllium exceed the Florida surface water cleanup target level value. Aluminum was detected at a concentration (758 micrograms per liter [$\mu g/\ell$]) that exceeded the Florida GCTL of 200 $\mu g/\ell$.

5.8 GROUNDWATER RESULTS. The groundwater assessment at Site 16 consisted of collecting groundwater screening samples using PCPT during Phases I and IIA and sampling all on-site monitoring wells installed at Sites 16.

5.8.1 Phase I Groundwater Samples The RI Phase I investigation at Site 16 consisted of an initial series of PCPT explorations to better define lithology in the interpreted hydrogeologically downgradient western perimeter (Figure 5-1) and collection of groundwater samples for screening purposes. VOCs (benzene, chlorobenzene, 1,2-dichloroethane, 1,2-dichloroethene, toluene, trichloroethene (TCE), and xylene) were detected in some or all of the groundwater screening samples, but were primarily detected at location 16Q001. TCE was detected in at least one sample from each location. TCE detections ranged from a low of 13 $\mu g/\ell$ to a high of 24 $\mu g/\ell$ at location 16Q001. 1,2-Dichloroethene was detected at

Table 5-16
Organic and Inorganic Analytes Detected in Site 16 Surface Water Sample

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Location Identifier: Sample Identifier: Collection Date: Laboratory Sample No.:	16-W-001 16W00101 05-JAN-96 RA903003	Florida Surface Water Cleanup Target Level	Florida Groundwater Cleanup Target Level
Volatile Organic Compounds ($\mu g/\ell$)			
None detected			
Semivolatile Organic Compounds ($\mu g/\ell$)			
None detected			
Pesticides and PCBs ($\mu g/\ell$)			
None detected			
Inorganic Analytes ($\mu g/\ell$)			
Aluminum	758	13	200
Barium	28.6 J	NA	2,000
Beryllium	0.21 J	0.13	4
Calcium	8,890	NA	NA
Iron	730	1,000	300
Lead	5.2	[1]5.6	15
Magnesium	1,170 J	NA	NA
Manganese	4.4 J	NA	50
Potassium	2,780 J	NA	NA
Sodium	1,120 J	NA	160,000
Zinc	29.2	[1]86	5,000

[1] Marine surface water criteria used.

Notes: Chapter 62-302.530, Florida Administrative Code.

FSWQS = Florida Surface Water Quality Standards.
$\mu g/\ell$ = micrograms per liter.
PCB = polychlorinated biphenyl.
Bold indicates analyte exceeded cleanup target level.
NA = not applicable.
J = estimated value.

16Q007 to a high of 55 $\mu g/\ell$ at location 16Q002. 1,2-Dichloroethane was detected at locations 16Q002 and 16Q003 ranging from a low of 2 $\mu g/\ell$ at location 16Q004 to a high of 20 $\mu g/\ell$ at location 16Q002. Chlorobenzene, benzene, toluene, and xylenes were only detected at location 16Q002. Chlorobenzene was detected ranging from a low of 1 $\mu g/\ell$ to a high of 932 $\mu g/\ell$. Toluene was detected ranging from a low of 1 $\mu g/\ell$ to a high of 2 $\mu g/\ell$. Xylene was detected ranging from a low of 2 $\mu g/\ell$ to a high of 3 $\mu g/\ell$.

Groundwater samples collected using the PCPT or BAT samplers are considered appropriate for preliminary screening but are not used to support risk assessment conclusions or decision making relative to response actions.

5.8.2 Phase II Groundwater Samples Groundwater samples were collected at Site 16 during the Phase IIA event (November to December 1993) and during two Phase IIB events in July to November 1996 and July 1997. The results of the Phase IIA and IIB sampling are presented separately in the following sections. The locations of the Site 16 monitoring wells are shown on Figure 3-2 or 5-1.

The concentrations of inorganic analytes detected in groundwater samples collected during the Phase IIB sampling event (1996 and 1997) are generally lower than the corresponding samples collected during the Phase IIA sampling event (1993) due to a change in the sampling method. Groundwater samples collected during Phase IIB were collected using the low-flow sampling process. This procedure resulted in less turbid groundwater samples for the Phase IIB sampling event as compared to the groundwater samples collected during Phase IIA. Because the low-flow sampling method produces less turbid samples that are more representative of the surficial aquifer than those obtained with a bailer, the preferred data set was from the Phase IIB sampling event. Therefore, Tables 20 through 23 and the summary tables found in Chapters 6.0 and 7.0, were produced exclusively from Phase IIB groundwater sample data.

Field Parameters. Groundwater field parameter results are presented in Table 5-17. The pH values for groundwater samples collected at Site 16 ranged from 4.15 to 6.8 SUs. The pH values were below the lower range for the Florida secondary drinking water requirements of 6.5 SUs but were within the range observed in background samples collected at NAS Whiting Field (HLA, 1998). The temperature measurements ranged from 22.0 to 29.8 degrees Celsius (°C), and the specific conductance ranged from 12 to 376 micromhos per centimeter (μmhos/cm).

Turbidity measurements for Site 16 Phase IIB groundwater samples ranged from 0.11 to greater than 200 NTUs. The Phase IIB groundwater samples collected at Site 16 had turbidity measurements below 10 NTUs with the exception of six monitoring wells, WHF-16-2S, WHF-16-3II, WHF-16-3D, WHF-16-4D, WHF-16-5, and WHF-16-6S, which were measured as 13, 53, 67.5, (19, 18.04), 12, and (153, greater than 200) respectively. Excluding the measurement from these wells, the low-flow sampling method produced average turbidity measurements of 4.27 NTUs.

Phase IIA Sampling Event. Tables 5-18 and 5-19 present organic and inorganic analytical results for groundwater samples collected from 12 monitoring wells located at Site 16 during the Phase IIA (1993) sampling event, which are shown on Figure 3-4. Organic analytes detected consisted of seven VOCs, including methylene chloride, 1,2-dichloroethene, chloroform, 1,2-dichloroethane, TCE,

Table 5-17
Summary of Groundwater Field Parameters

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Monitoring Well Designation	Date Sampled	pH (SU)	Temperature (°C)	Specific Conductance (μmhos/cm)	Turbidity (NTU)	Redox (mV)	DO (mg/ℓ)
Phase IIA							
WHF-16-1	16-NOV-93	4.50	21.6	29	1.58	--	--
WHF-16-2S	06-DEC-93	4.73	19.8	29	1,381	--	--
WHF-16-2	10-NOV-93	5.25	22.7	44	5.28	--	--
WHF-16-2D	06-DEC-93	5.38	22.0	38	0.98	--	--
WHF-16-3S	15-NOV-93	6.51	23.0	429	479	--	--
WHF-16-3I	12-NOV-93	4.93	21.2	44	42.3	--	--
WHF-16-3II	12-NOV-93	5.42	21.1	40.5	2,528	--	--
WHF-16-3D	11-NOV-93	6.66	22.0	112	114	--	--
WHF-16-4S	16-NOV-93	5.85	22.0	490	320	--	--
WHF-16-4II	16-NOV-93	5.01	22.0	28	10.7	--	--
WHF-16-4D	15-NOV-93	5.70	22.7	42	46.6	--	--
WHF-16-5	17-NOV-93	4.21	20.8	11	3.85	--	--
Phase IIB							
WHF-16-1	19-AUG-96	4.74	24.7	18	4.0	--	0.01
WHF-16-1	24-JUL-97	4.15	24.0	25	0.74	354	3.6
WHF-16-2S	14-AUG-96	4.83	25.7	20	13	--	0.22
WHF-16-2	15-AUG-96	4.99	26.8	37	4	--	0.12
WHF-16-2	19-NOV-96	5.17	22.2	35	0.6	286.2	2.7
WHF-16-2	23-JUL-97	5.68	25.0	62	0.11	279.1	0.5
WHF-16-2D	15-AUG-96	4.78	25.6	20	4	--	0.03
WHF-16-2D	19-NOV-96	4.75	22.0	20	1.2	307.2	3.1
WHF-16-2D	23-JUL-97	5.35	25.0	22	4.84	354.3	2.3

See notes at end of table.

Table 5-17 (Continued)
Summary of Groundwater Field Parameters

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Monitoring Well Designation	Date Sampled	pH (SU)	Temperature (°C)	Specific Conductance (µmhos/cm)	Turbidity (NTU)	Redox (mV)	DO (mg/ℓ)
Phase IIB (Continued)							
WHF-16-3S	20-AUG-96	5.86	22.8	172	2	--	0.02
WHF-16-3S	24-JUL-97	5.55	23.5	180	2.59	292	1.6
WHF-16-3I	20-AUG-96	4.87	27.1	22	3	--	0.33
WHF-16-3I	22-JUL-97	4.66	22.5	31	2.35	367	3.4
WHF-16-3II	21-AUG-96	5.24	23.1	32	53	--	1.36
WHF-16-3II	22-JUL-97	4.95	22.5	39	9.95	251.4	1.0
WHF-16-3D	20-AUG-96	6.61	29.8	91	9.8	--	0.64
WHF-16-3D	24-JUL-97	6.21	23.5	102	67.5	185.6	0.8
WHF-16-4S	19-AUG-96	6.79	26.3	376	3	--	0.06
WHF-16-4S	22-JUL-97	6.01	22.0	295	9.07	255	2.4
WHF-16-4II	19-AUG-96	5.15	28.1	29	3	--	0.03
WHF-16-4II	22-JUL-97	4.63	23.0	25	9.67	324.9	1.1
WHF-16-4D	16-AUG-96	5.24	29.1	38	2	--	0.08
WHF-16-4D	22-NOV-96	5.31'	21.2	40	19	136.8	3.4
WHF-16-4D	22-JUL-97	5.41	23.0	70	18.04	169.8	1.2
WHF-16-5	21-AUG-96	5.08	21.1	12	12	--	1.22
WHF-16-6S	16-AUG-96	6.31	26.5	260	153	--	0.03
WHF-16-6S	23-JUL-97	6.80	26.0	300	>200	305.2	1.2
WHF-16-6D	15-AUG-96	4.78	28.6	28	1	--	0.03
WHF-16-6D	23-JUL-97	5.00	24.0	32	2.86	391.9	2.8
WHF-16-7S	25-JUL-96	6.45	24.7	241	1	--	1.45
WHF-16-7S	25-JUL-97	6.18	25.2	190	2.71	17.4	3.0
WHF-16-7I	25-JUL-96	5.04	22.7	39	9	--	1.08
WHF-16-7I	21-NOV-96	5.01	22.1	23	1.0	216.9	2.8
WHF-16-7I	25-JUL-97	5.09	24.0	32	8.7	314	0.079

See notes at end of table.

Table 5-17 (Continued)
Summary of Groundwater Field Parameters

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Monitoring Well Designation	Date Sampled	pH (SU)	Temperature (°C)	Specific Conductance (μmhos/cm)	Turbidity (NTU)	Redox (mV)	DO (mg/ℓ)
Phase IIB (Continued)							
WHF-16-7D	25-JUL-96	5.98	22.6	98	4	--	1.26
WHF-16-7D	21-NOV-96	5.48	21.6	33	1.2	230.2	2.0
WHF-16-7D	25-JUL-97	5.48	25.0	40	3.89	251.7	4.4

Notes: SU = standard unit.
°C = degrees Celsius.
μmhos/cm = micromhos per centimeter.
NTU = nephelometric turbidity unit.
Redox = oxidation reduction potential.
mV = millivolt.
DO = dissolved oxygen.
mg/ℓ = milligrams per liter.
% = percent.
-- = parameter not recorded.

Table 5-18
Summary of Organic Compounds Detected in Site 16 Groundwater Samples Phase IIA
November 1993

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	Shallow Monitoring Wells					Intermediate Monitoring Wells		Background Screening Criteria	Federal/State Standards
Location Identifier:	WHF-16-2	WHF-16-3S	WHF-16-4S	WHF-16-4S	WHF-16-5	WHF-16-1	WHF-16-2		
Sample Identifier:	WHF16-2B	WHF16-3B	WHF16-4B	WHF16-4BA	WHF16-5	WHF16-1	WHF16-2		
Date Sampled:	06-DEC-93	15-NOV-93	16-NOV-93	16-NOV-93	17-NOV-93	16-NOV-93	24-NOV-93		
Laboratory Sample No.:	90272002	90225001	90226001	90226002	90236003	90226004	90214002		
<u>Volatile Organic Compounds</u> (µg/ℓ)									
Methylene chloride	--	--	2 J	--	--	--	--	ND	[1]5/[1]5
1,2-Dichloroethene (total)	--	--	--	--	--	--	4 J	ND	[1,4]70/[1,4]70
Chloroform	--	--	--	--	--	--	3 J	ND	[1]100/[3]5.7
1,2-Dichloroethane	--	--	--	--	--	--	3 J	ND	[1]5/[1]3
Trichloroethene	--	--	--	--	--	--	6 J	ND	[1]5/[1]3
Benzene	--	--	--	--	--	--	59 J	8	[1]5/[1]1
Ethylbenzene	--	--	--	--	--	--	--	ND	[1]700/[2]30
<u>Semivolatile Organic Compounds</u> (µg/ℓ)									
bis(2-Ethylhexyl)phthalate	--	--	--	--	2 J	--	--	ND	[1]6/[1]6
<u>Pesticides and PCBs</u> (µg/ℓ)									
None detected									

See notes at end of table.

Table 5-18 (Continued)
Summary of Organic Compounds Detected in Site 16 Groundwater Samples Phase IIA
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	Intermediate Monitoring Wells				Deep Monitoring Wells			Background Screening Criteria	Federal/State Standards
Location Identifier:	WHF-16-3I	WHF-16-3II	WHF-16-4II	WHF-16-2I	WHF-16-3D	WHF-16-3D DUP	WHF-16-4D		
Sample Identifier:	WHF16-3C	WHF16-3CD	WHF16-4CD	WHF16-2C	WHF16-3D	WHF16-3DA	WHF16-4D		
Date Sampled:	12-NOV-93	12-NOV-93	16-NOV-93	06-DEC-93	11-NOV-93	11-NOV-93	15-NOV-93		
Laboratory Sample No.:	90221002	90221001	90226003	90272001	90220001	90220002	90225002		
Volatile Organic Compounds ($\mu g/\ell$)									
Methylene chloride	--	--	--	--	--	--	--	ND	[1]5/[1]5
1,2-Dichloroethene (total)	2 J	34 J	--	--	--	--	--	ND	[1,4]70/[1,4]70
Chloroform	3 J	--	--	--	--	--	--	ND	[1]100/[3]5.7
1,2-Dichloroethane	--	--	--	20	--	--	--	ND	[1]5/[1]3
Trichloroethene	4 J	--	4 J	--	--	--	--	ND	[1]5/[1]3
Benzene	--	--	--	560 J	--	--	--	8	[1]5/[1]1
Ethylbenzene	--	22 J	--	--	--	--	--	ND	[1]700/[2]30
Semivolatile Organic Compounds ($\mu g/\ell$)									
bis(2-Ethylhexyl)phthalate	--	8 J	10	--	--	--	--	ND	[1]6/[1]6
Pesticides and PCBs ($\mu g/\ell$)									
None detected									

[1] Primary maximum contaminant level (MCL).
[2] Secondary MCL.
[3] Cleanup Target Level, Chapter 62-777, FAC (FDEP, 1999).
[4] cis 1,2-Dichloroethene was used for comparison.

Notes: DUP = duplicate sample.
$\mu g/\ell$ = micrograms per liter.
-- = compound was not detected above instrument detection limits.
ND = compound not detected in background sample.
J = estimated concentration.
PCB = polychlorinated biphenyl.

Table 5-19
Summary of Inorganic Analytes Detected in Site 16 Groundwater Samples Phase IIA
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	Shallow Monitoring Wells					Intermediate Monitoring Wells		Background Screening Criteria	Federal/State Standards
Location Identifier:	WHF-16-2S	WHF-16-3S	WHF-16-4S	WHF-16-4S	WHF-16-5	WHF-16-1	WHF-16-2		
Sample Identifier:	WHF16-2B	WHF16-3B	WHF16-4B	WHF16-4BA	WHF16-5	WHF16-1	WHF16-2		
Date Sampled:	06-DEC-93	15-NOV-93	16-NOV-93	16-NOV-93	17-NOV-93	16-NOV-93	24-NOV-93		
Laboratory Sample No.:	90272002	90225001	90226001	90226002	90236003	90226004	90214002		
Metals and Cyanide ($\mu g/\ell$)									
Aluminum	12,400	--	6,280	5,170	64.8 J	27.2 J	178 J	53,360	[2]200/[2]200
Arsenic	--	4.5 J	3.1 J	--	--	1.7 J	--	ND	[1]50/[1]50
Barium	77.8 J	105 J	25.9 J	26.3 J	7.9 J	31.5 J	12.3 J	126.8	[1]2,000/[1]2,000
Beryllium	0.26 J	4.7 J	--	--	--	--	--	3.6	[1]4/[1]4
Cadmium	--	--	--	--	--	--	5	ND	[1]5/[1]5
Calcium	785 J	79,400	91,600	90,300	157 J	1,090 J	859 J	4,706	NA/NA
Chromium	35.5	219	7 J	7 J	--	--	--	872	[1]100/[1]100
Cobalt	5 J	21.3 J	--	--	--	--	--	20.7	NA/420
Copper	14 J	43.6 J	6.6 J	6.5 J	--	8.2 J	--	67.2	[2]1,000/[2]1,000
Iron	12,400	313,000	4,640	3,370	35 J	34.5 J	135	80,066	[2]300/[2]300
Lead	5.6	15.2	6.1	4.7	--	1.8 J	1.3 J	20.6	TT 15/[1]15
Magnesium	1,270 J	6,780 J	7,840	7,720	270 J	1,020 J	534 J	2,922	NA/NA
Manganese	44.4	1,050	81.1	67.2	1.7 J	4.2 J	20.5	188	[2]50/[2]50
Mercury	0.3 J	0.23	--	--	--	--	--	0.32	[1]2/[1]2
Nickel	--	82.4 J	--	--	--	10.6 J	--	744	[2]100/[2]100
Potassium	1,830 J	7,000 J	3,360 J	3,540 J	--	852 J	--	17,270	NA/NA
Silver	--	24.3 J	--	--	--	--	--	ND	[1]100/[1]100
Sodium	2,930 J	6,980 J	3,270 J	3,090 J	1,630 J	2,300 J	6,850	5,740	NA/[1]160,000
Vanadium	37.3 J	987	14.2 J	11.5 J	--	--	--	335	NA/49
Zinc	97.7	152	92.5	68	2.2 J	29	6.5 J	140	[1]5,000/[1]5,000
Cyanide	--	--	--	--	--	--	1.7 J	4.2	[2]200/[2]200

See notes at end of table.

Table 5-19 (Continued)
Summary of Inorganic Analytes Detected in Site 16 Groundwater Samples Phase IIA
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	Intermediate Monitoring Wells				Deep Monitoring Wells			Background Screening Criteria	Federal/State Standards
Location Identifier:	WHF-16-3I	WHF-16-3II	WHF-16-4II	WHF-16-2I	WHF-16-3D	WHF-16-3D DUP	WHF-16-4D		
Sample Identifier:	WHF16-3C	WHF16-3CD	WHF16-4CD	WHF16-2C	WHF16-3D	WHF16-3DA	WHF16-4D		
Date Sampled:	12-NOV-93	12-NOV-93	16-NOV-93	06-DEC-93	11-NOV-93	11-NOV-93	15-NOV-93		
Laboratory Sample No.:	90221002	90221001	90226003	90272001	90220001	90220002	90225002		
Metals and Cyanide (µg/ℓ)									
Aluminum	82,600	552	111 J	25.1 J	1,370	2,590 J	--	53,360	[2]200/[2]200
Arsenic	3.7 J	--	--	--	1.9 J	2 J	--	ND	[1]50/[1]50
Barium	297	18.2 J	15.7 J	34.4 J	19.1 J	20.4 J	20.3 J	126.8	[1]2,000/[1]2,000
Beryllium	3.6 J	--	--	--	0.32 J	0.45 J	--	3.6	[1]4/[1]4
Cadmium	56.5	3.5 J	3.9 J	--	--	5.6	--	ND	[1]5/[1]5
Calcium	23,000	1,370 J	1,970 J	2,120 J	2,410 J	2,420 J	6,350	4,706	NA/NA
Chromium	225	--	--	3.4 J	4.3 J	5.1 J	3.8 J	872	[1]100/[1]100
Cobalt	6.2 J	--	--	--	--	--	--	20.7	NA/420
Copper	87.1	2.5 J	--	2.8 J	2.6 J	2.4 J	--	67.2	[2]1,000/[2]1,000
Iron	83,700	565	140	545	923 J	1,230 J	223	80,066	[2]300/[2]300
Lead	69.1	1.1 J	--	1.6 J	--	--	1.2 J	20.6	TT 15/[1]15
Magnesium	8,660	514 J	459 J	1,400 J	903 J	955 J	528 J	2,922	NA/NA
Manganese	498	52.6	18.2	115	93.4	94.1	59.1	188	[2]50/[2]50
Mercury	0.48	--	--	0.16 J	--	--	--	0.32	[1]2/[1]2
Nickel	38.5 J	--	--	--	--	--	--	744	[2]100/[2]100
Potassium	4,780 J	708 J	--	--	1,890 J	1,770 J	--	17,270	NA/NA
Silver	--	--	--	3.9 J	--	--	--	ND	[1]100/[1]100
Sodium	13,500	6,770	3,690 J	3,330 J	23,200	23,000	3,180 J	5,740	NA/[1]160,000

See notes at end of table.

Table 5-19 (Continued)
Summary of Inorganic Analytes Detected in Site 16 Groundwater Samples Phase IIA
November 1993

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	Intermediate Monitoring Wells				Deep Monitoring Wells			Background Screening Criteria	Federal/State Standards
Location Identifier:	WHF-16-3I	WHF-16-3II	WHF-16-4II	WHF-16-2I	WHF-16-3D	WHF-16-3D DUP	WHF-16-4D		
Sample Identifier:	WHF16-3C	WHF16-3CD	WHF16-4CD	WHF16-2C	WHF16-3D	WHF16-3DA	WHF16-4D		
Date Sampled:	12-NOV-93	12-NOV-93	16-NOV-93	06-DEC-93	11-NOV-93	11-NOV-93	15-NOV-93		
Laboratory Sample No.:	90221002	90221001	90226003	90272001	90220001	90220002	90225002		
Metals and Cyanide ($\mu g/\ell$) (Continued)									
Vanadium	120	--	--	--	4.4 J	5 J	3.5 J	335	NA/49
Zinc	451	22.3 J	25.7	8 J	14.7 J	17.8 J	3.3 J	140	[1]5,000/[1]5,000
Cyanide	1.9 J	--	--	--	--	--	--	4.2	[2]200/[2]200

[1] Primary maximum contaminant level (MCL).
[2] Secondary MCL.
[3] Groundwater Guidance Concentration.

Notes: $\mu g/\ell$ = micrograms per liter.
-- = compound was not detected above instrument detection limits.
J = estimated concentration.
ND = compound not detected in background sample.
NA = no applicable standard currently exists.
TT = treatment technique.
DUP = duplicate sample.

benzene, and ethylbenzene and one SVOC bis(2-ethylhexyl)phthalate. No pesticides or TRPH were detected.

Twenty-one inorganic analytes and cyanide were detected in groundwater samples from Site 16 monitoring wells. Seventeen inorganic analytes, including aluminum, arsenic, barium, beryllium, cadmium, calcium, cobalt, copper, iron, lead, magnesium, manganese, mercury, silver, sodium, vanadium, and zinc were detected in groundwater samples at concentrations that equaled or exceeded the background screening criteria. Seven of the analytes (aluminum, beryllium, chromium, iron, lead, manganese, and vanadium) was detected at concentrations exceeding either the Federal or State maximum containment levels (MCLs) (Table 5-19).

Phase IIB Sampling Events. Tables 5-20 and 5-21 present organic analytical results and Tables 5-22 and 5-23 present inorganic analytical results for groundwater samples collected at Site 16 during the Phase IIB sampling events conducted from July to August and November 1996 and in July 1997, respectively. Tables 5-24 and 5-25 summarize the frequency of detection, reporting range limits, detected concentration range, average detected concentrations, background screening concentrations, and Federal and State regulatory limits of the 1996 and 1997 sampling event.

Shallow Groundwater Samples. The following analytes were detected in groundwater samples collected from monitoring wells screened in the shallow surficial water table in one or both groundwater sampling events (1996 and 1997).

VOCs. No VOCs were detected in the groundwater samples collected from the shallow monitoring wells at Site 16 nor were VOCs detected in background groundwater samples

SVOCs. One SVOC, bis(2-ethylhexyl)phthalate, was detected in groundwater samples collected from the shallow monitoring wells WHF-16-5S at a concentration of 2 μg/ℓ, but was not detected in the duplicate sample WHF-16-5SDUP, and was detected in WHF-16-6S at a concentration of 1 μg/ℓ. These concentrations are below the Federal MCL and Florida groundwater guidance concentrations 6 μg/ℓ for bis(2-ethylhexyl)phthalate. Bis(2-ethylhexyl)phthalate was not detected in background groundwater samples.

Pesticides. One pesticide (4,4'-DDT) was detected in a sample from groundwater monitoring well WHF-16-6S at a concentration of 0.15 μg/ℓ. This concentration exceeds the Florida GCTL of 0.1 μg/ℓ. No PCBs were detected in any shallow Phase IIB groundwater samples.

Inorganic Analytes. Twenty inorganic analytes (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, zinc and cyanide) were detected in shallow groundwater samples collected from Site 16. Thirteen inorganic analytes (aluminum, barium, cadmium, calcium, copper, iron, magnesium, manganese, potassium, sodium, vanadium, zinc, and cyanide) were detected at concentrations exceeding the background screening concentrations.

Six inorganic analytes (aluminum, antimony, beryllium, cadmium, iron, and manganese) were detected at concentrations exceeding either Federal or State regulatory limits, as listed below.

Table 5-20
Organic Compounds Detected in Site 16 Groundwater Samples, Phase IIB
July to August 1996

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

	Shallow Monitoring Wells							
Location Identifier:	WHF-16-1S	WHF-16-2S	WHF-16-2S	WHF-16-3S	WHF-16-4S	WHF-16-5S	WHF-16-5S DUP	WHF-16-5S
Sample Identifier:	16G00101	16G00201	16G00201F	16G00301	16G00401	16G00501	16G00501D	16G00501F
Date Sampled:	19-AUG-96	14-AUG-96	14-AUG-96	20-AUG-96	19-AUG-96	21-AUG-96	21-AUG-96	21-AUG-96
Laboratory Sample No.:	RC016004	RB980006	RB980014	RC016005	RC016002	RC016009	RC016013	RC016001
Volatile Organic Compounds ($\mu g/\ell$)								
1,2-Dichloroethane	--	--	NA	--	--	--	--	NA
1,2-Dichloroethene (total)	--	--	NA	--	--	--	--	NA
Benzene	--	--	NA	--	--	--	--	NA
Chloroform	--	--	NA	--	--	--	--	NA
Ethylbenzene	--	--	NA	--	--	--	--	NA
Toluene	--	--	NA	--	--	--	--	NA
Trichloroethene	--	--	NA	--	--	--	--	NA
Xylenes (total)	--	--	NA	--	--	--	--	NA
Semivolatile Organic Compounds ($\mu g/\ell$)								
Naphthalene	--	--	NA	--	--	--	--	NA
Phenol	--	--	NA	--	--	--	--	NA
bis(2-Ethylhexyl)phthalate	--	--	NA	--	--	2 J	--	NA
Pesticides and PCBs ($\mu g/\ell$)								
4,4'-DDT	--	--	NA	--	--	--	--	NA

See notes at end of table

Table 5-20 (Continued)
Organic Compounds Detected in Site 16 Groundwater Samples, Phase IIB
July to August 1996

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

	Shallow Monitoring Wells			Intermediate Monitoring Wells				
Location Identifier:	WHF-16-6S	WHF-16-6S	WHF-16-7S	WHF-16-2I	WHF-16-3I	WHF-16-3II	WHF-16-3II	WHF-16-4I
Sample Identifier:	16G00601	16G00601F	16G00701	16G00202	16G00302	16G00303	16G00303F	16G00402
Date Sampled:	16-AUG-96	16-AUG-96	25-JUL-96	15-AUG-96	20-AUG-96	21-AUG-96	21-AUG-96	19-AUG-96
Laboratory Sample No.:	RB980019	RB980022	RB887015	RB980016	RC016006	RC016008	RC016010	RC016003
Volatile Organic Compounds (µg/ℓ)								
1,2-Dichloroethane	--	NA	--	--	--	2 J	NA	--
1,2-Dichloroethene (total)	--	NA	--	41	--	3 J	NA	--
Benzene	--	NA	--	[1]750	--	--	NA	--
Chloroform	--	NA	--	1 J	--	--	NA	--
Ethylbenzene	--	NA	--	3 J	--	--	NA	--
Toluene	--	NA	--	--	--	--	NA	--
Trichloroethene	--	NA	--	6 J	--	2 J	NA	2 J
Xylenes (total)	--	NA	--	--	--	--	NA	--
Semivolatile Organic Compounds (µg/ℓ)								
Naphthalene	--	NA	--	1 J	--	--	NA	--
Phenol	--	NA	--	--	--	--	NA	--
bis(2-Ethylhexyl)phthalate	1 J	NA	--	1 J	--	--	NA	1 J
Pesticides and PCBs (µg/ℓ)								
4,4'-DDT	0.15 J	NA	--	--	--	--	NA	--

See notes at end of table.

Table 5-20 (Continued)
Organic Compounds Detected in Site 16 Groundwater Samples, Phase IIB
July to August 1996

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

	Intermediate Monitoring Wells		Deep Monitoring Wells			
Location Identifier:	WHF-16-6I	WHF-16-7I	WHF-16-2D	WHF-16-3D	WHF-16-4D	WHF-16-7D
Sample Identifier:	16G00602	16G00702	16G00203	16G00304	16G00403	16G00703
Date Sampled:	15-AUG-96	25-JUL-96	15-AUG-96	20-AUG-96	16-AUG-96	25-JUL-96
Laboratory Sample No.:	RB980018	RB887016	RB980017	RC016007	RB980020	RB887017
Volatile Organic Compounds (µg/ℓ)						
1,2-Dichloroethane	--	--	--	--	--	--
1,2-Dichloroethene (total)	--	39	--	--	1 J	10
Benzene	--	--	5 J	--	--	--
Chloroform	--	--	--	--	--	--
Ethylbenzene	--	5 J	--	--	--	--
Toluene	--	1 J	1 J	--	--	--
Trichloroethene	--	5 J	--	--	--	2 J
Xylenes (total)	--	1 J	--	--	--	--
Semivolatile Organic Compounds (µg/ℓ)						
Naphthalene	--	1 J	--	--	1 J	--
Phenol	--	--	5 J	--	8 J	4 J
bis(2-Ethylhexyl)phthalate	6 J	--	--	53	1 J	--
Pesticides and PCBs (µg/ℓ)						
4,4'-DDT	0.14 J	--	--	--	--	--

[1] RB980016DL.

Notes: µg/ℓ = micrograms per liter.
-- = compound was not detected.
NA = not applicable.
J = estimated value.
PCB = polychlorinated biphenyl.
DDT = dichlorodiphenyltrichloroethane.

Table 5-21
Organic Compounds Detected in Site 16 Groundwater Samples, Phase IIB
July 1997

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

	Shallow Monitoring Wells							
Location Identifier:	WHF-16-1S	WHF-16-1S	WHF-16-3S	WHF-16-4S	WHF-16-4S	WHF-16-6S	WHF-16-6S	WHF-16-7S
Sample Identifier:	16G00101	16G00101D	16G00301	16G00401	16G00401D	16G00601	16G00601F	16G00701
Date Sampled:	24-JUL-97	24-JUL-97	24-JUL-97	22-JUL-97	22-JUL-97	23-JUL-97	23-JUL-97	25-JUL-97
Laboratory Sample No.:	ME340009	ME340010	ME340008	RC016002	ME306004	ME340002	WSME340003	WTME348004
Volatile Organic Compounds ($\mu g/\ell$)								
1,2-Dichloroethane	--	--	--	--	--	--	--	--
1,2-Dichloroethene (total)	--	--	--	--	--	--	--	--
Benzene	--	--	--	--	--	--	--	--
Chloroform	--	--	--	--	--	--	--	--
Ethylbenzene	--	--	--	--	--	--	--	--
Toluene	--	--	--	--	--	--	--	--
Trichloroethene	--	--	--	--	--	--	--	--
Xylenes (total)	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds ($\mu g/\ell$)								
Naphthalene	--	--	--	--	--	--	--	--
Phenol	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	--	--	--	--	--	--	--	--
Pesticides and PCBs ($\mu g/\ell$)								
4,4'-DDT	--	--	--	--	--	--	--	--

See notes at end of table.

Table 5-21 (Continued)
Organic Compounds Detected in Site 16 Groundwater Samples, Phase IIB
July 1997

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

	Intermediate Monitoring Wells						Deep Monitoring Wells			
Location Identifier:	WHF-16-2I	WHF-16-3I	WHF-16-3II	WHF-16-4I	WHF-16-6I	WHF-16-7I	WHF-16-2D	WHF-16-3D	WHF-16-4D	WHF-16-7D
Sample Identifier:	16G00202	16G00302	16G00303	16G00402	16G00602	16G00701	16G00203	16G00304	16G00403	16G00703
Date Sampled:	23-JUL-97	22-JUL-97	22-JUL-97	22-JUL-97	23-JUL-97	25-JUL-97	23-JUL-97	24-JUL-97	22-JUL-97	25-JUL-97
Laboratory Sample No.:	ME322004	ME322002	ME322003	ME306005	ME340004	ME348004	ME322005	ME348006	ME306006	ME348003
Volatile Organic Compounds ($\mu g/\ell$)										
1,2-Dichloroethane	24 J	--	8 J	1 J	--	--	--	--	29 J	20
1,2-Dichloroethene (total)	50	--	12	1 J	--	--	--	--	--	10 J
Benzene	820	--	130	28	--	--	1 J	--	760	520*
Chloroform	--	1 J	1 J	--	--	--	--	--	--	--
Ethylbenzene	6 J	--	--	--	--	--	--	--	--	--
Toluene	--	--	--	--	--	--	--	--	--	--
Trichloroethene	7 J	--	2 J	3 J	--	--	--	--	--	--
Xylenes (total)	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds ($\mu g/\ell$)										
Naphthalene	--	--	--	--	--	--	--	--	--	--
Phenol	--	--	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	--	--	--	--	--	--	--	--	--	--
Pesticides and PCBs ($\mu g/\ell$)										
4,4'-DDT	--	--	--	--	--	--	--	--	--	--

Notes: F = filtered.
$\mu g/\ell$ = micrograms per liter.
-- = compound was not detected.
PCB = polychlorinated biphenyl.
DDT = dichlorodiphenyltrichloroethane.
J = estimated value.
* = dilution equals ME348003DL.

Table 5-22
Inorganic Analytes Detected in Phase IIB Groundwater Samples at Site 16
August 1996

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

	Shallow Monitoring Wells							
Location Identifier:	WHF-16-1S	WHF-16-2S	WHF-16-2S	WHF-16-3S	WHF-16-4S	WHF-16-5S	WHF-16-5S	WHF-16-5S
Sample Identifier:	16G00101	16G00201	16G00201F	16G00301	16G00401	16G00501	16G00501D	16G00501F
Collection Date:	19-AUG-96	14-AUG-96	14-AUG-96	20-AUG-96	19-AUG-96	21-AUG-96	21-AUG-96	21-AUG-96
Laboratory Sample No.:	RC016004	RB980006	RB980014	RC016005	RC016002	RC016009	RC016016	RC016011
Inorganic Analytes (µg/ℓ)								
Aluminum	--	--	--	--	--	--	--	--
Antimony	--	--	--	--	--	--	--	--
Arsenic	--	--	--	--	0.6 J	--	--	--
Barium	24.1 J	17.4 J	17.4 J	40.7 J	59.4 J	10 J	10 J	10 J
Beryllium	--	--	--	--	0.42 J	--	--	--
Cadmium	--	--	--	--	12.5	--	--	--
Calcium	623 J	--	--	24,900	78,800	--	--	--
Chromium	2.1 J	--	--	--	--	--	--	--
Cobalt	--	3 J	--	--	--	3.2 J	--	--
Copper	--	--	--	--	1.7 J	--	--	--
Cyanide	--	--	--	--	--	--	--	--
Iron	39.9 J	--	--	176	167	9.2 J	5.3 J	119
Lead	--	--	--	--	--	--	--	--
Magnesium	685 J	484 J	464 J	2,850 J	8,690	276 J	261 J	305 J
Manganese	3.8 J	2.1 J	2.5 J	3 J	65.4	--	2.1 J	3 J
Nickel	--	--	--	--	--	--	--	--
Potassium	375 J	476 J	--	3,730 J	4,790 J	--	--	471 J
Sodium	1,860 J	2,690 J	2,670 J	--	3,490 J	1,550 J	1,450 J	1,510 J
Vanadium	--	--	--	--	--	--	--	--
Zinc	114	--	--	--	--	--	--	--

See notes at end of table.

Table 5-22 (Continued)
Inorganic Analytes Detected in Phase IIB Groundwater Samples at Site 16
August 1996

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

	Shallow Monitoring Wells			Intermediate Monitoring Wells				
Location Identifier:	WHF-16-6S	WHF-16-6S	WHF-16-7S	WHF-16-2I	WHF-16-3I	WHF-16-3II	WHF-16-3II	WHF-16-4I
Sample Identifier:	16G00601	16G00601F	16G00701	16G00202	16G00302	16G00303	16G00303F	16G00402
Collection Date:	16-AUG-96	16-AUG-96	25-JUL-96	15-AUG-96	20-AUG-96	21-AUG-96	21-AUG-96	19-AUG-96
Laboratory Sample No.:	RB980019	RB980022	RB887015	RB980016	RC016006	RC016008	RC016008	RC0160103
Inorganic Analytes (µg/ℓ)								
Aluminum	3,040	--	137 J	--	--	395	--	--
Antimony	--	--	--	--	--	--	--	--
Arsenic	0.8 J	--	--	--	--	--	--	--
Barium	300	251	27.4 J	30.1 J	23.5 J	27.2 J	18.9 J	57.7 J
Beryllium	--	0.32 J	--	--	--	--	--	--
Cadmium	2.2 J	--	--	--	--	--	--	--
Calcium	61,900	61,900	36,000	1,990 J	1,060 J	1,070 J	962 J	8,460
Chromium	--	--	--	--	2.6 J	4.6 J	3.4 J	--
Cobalt	--	--	--	--	--	--	--	--
Copper	6.1 J	--	--	--	--	1.7 J	--	1.4 J
Cyanide	12	--	--	--	--	--	--	--
Iron	45,200	1,660	328	--	113	1,410	396	57.5 J
Lead	5.7	--	--	2.3 J	--	--	--	--
Magnesium	3,100 J	3,110 J	3,050 J	1,450 J	720 J	1,030 J	893 J	542 J
Manganese	516	425	10.5 J	12 J	47.3	60.3	53.3	7 J
Nickel	--	--	8.7 J	--	--	--	--	--
Potassium	2,010 J	2,110 J	3,470 J	331 J	401 J	--	--	--
Sodium	1,600 J	1,650 J	6,210	5,260	--	--	--	3,210 J
Vanadium	17.8 J	2.2 J	--	--	--	--	--	--
Zinc	56.4	--	--	168	--	--	--	--

See notes at end of table.

Table 5-22 (Continued)
Inorganic Analytes Detected in Phase IIB Groundwater Samples at Site 16
August 1996

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

	Intermediate Monitoring Wells		Deep Monitoring Wells			
Location Identifier:	WHF-16-6I	WHF-16-7I	WHF-16-2D	WHF-16-3D	WHF-16-4D	WHF-16-7D
Sample Identifier:	16G00602	16G00702	16G00203	16G00304	16G00403	16G00703
Collection Date:	15-AUG-96	25-JUL-96	15-AUG-96	20-AUG-96	16-AUG-96	25-JUL-96
Laboratory Sample No.:	RB980018	RB887016	RB980017	RC16007	RB980020	RB887017
Inorganic Analytes ($\mu g/\ell$)						
Aluminum	244	72.3	--	90.7 J	278	196
Antimony	--	--	--	--	--	--
Arsenic	--	--	--	--	1 J	2 J
Barium	17.4	15.6 J	21.5 J	13 J	28.6 J	10.8 J
Beryllium	--	--	--	--	--	--
Cadmium	--	--	--	--	--	--
Calcium	1,740 J	1,960 J	1,000 J	2,500 J	3,110 J	2,510 J
Chromium	--	--	--	--	2.3 J	--
Cobalt	--	--	--	--	--	--
Copper	2.6 J	--	--	--	--	--
Cyanide	--	--	--	--	--	--
Iron	232	201	--	111	1,370	151
Lead	0.5 J	--	--	--	4	--
Magnesium	590 J	612 J	732 J	988 J	1,320 J	496 J
Manganese	70.8	85	36.9	73.7	41.3	102
Nickel	--	--	--	7.7 J	--	--
Potassium	458 J	--	322 J	1,640 J	540 J	930 J
Sodium	3,680 J	4,100 J	--	20,600	2,570 J	18,500
Vanadium	1.5 J	--	--	--	2.2 J	--
Zinc	210	--	--	53.1	103	--

Notes: $\mu g/\ell$ = micrograms per liter.
-- = compound was not detected.
J = estimated value.

Table 5-23
Inorganic Analytes Detected in Site 16 Groundwater Samples, Phase IIB
July 1997

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

	Shallow Monitoring Wells							
Location Identifier:	WHF-16-1S	WHF-16-1S	WHF-16-3S	WHF-16-4S	WHF-16-4S	WHF-16-6S	WHF-16-6S	WHF-16-7S
Sample Identifier:	16G00101	16G00101DUP	16G00301	16G00401	16G00401D	16G00601	16G00601F	16G00701
Date Sampled:	24-JUL-97	24-JUL-97	24-JUL-97	22-JUL-97	22-JUL-97	23-JUL-97	23-JUL-97	25-JUL-97
Laboratory Sample No.:	WTME340009	WTME340010	WTME340008	NA	NA	WTMW340002	WSME340003	WTME348004
Inorganic Analytes (µg/ℓ)								
Aluminum	--	--	749	NS	NS	3,930	--	161 J
Antimony	--	--	--	NS	NS	--	124	--
Arsenic	--	--	--	NS	NS	--	--	--
Barium	20.5 J	20.7 J	39.3 J	NS	NS	456	310	32.9 J
Beryllium	--	--	--	NS	NS	--	10.3	--
Cadmium	--	--	--	NS	NS	--	--	--
Calcium	--	--	35,700	NS	NS	74,300	72,800	30,500
Chromium	--	--	--	NS	NS	--	--	--
Cobalt	--	--	--	NS	NS	--	--	--
Copper	--	--	--	NS	NS	--	--	--
Cyanide	--	--	--	NS	NS	--	--	--
Iron	--	--	1,040	NS	NS	68,600	656	1,770
Lead	--	--	--	NS	NS	--	--	--
Magnesium	617 J	623 J	3,450 J	NS	NS	3,680 J	3,680 J	2,850 J
Manganese	--	--	12.1 J	NS	NS	1,370	43.2	1,210
Nickel	--	--	--	NS	NS	--	--	--
Potassium	--	--	3,510 J	NS	NS	3,030 J	3,110 J	2,850 J
Sodium	2,130 J	2,110 J	--	NS	NS	2,730 J	2,940 J	7,490
Vanadium	--	--	--	NS	NS	25.2 J	--	--
Zinc	--	--	--	NS	NS	49.1	--	--

See notes at end of table.

Table 5-23 (Continued)
Inorganic Analytes Detected in Site 16 Groundwater Samples, Phase IIB
July 1997

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

	Intermediate Monitoring Wells					
Location Identifier:	WHF-16-2I	WHF-16-3I	WHF-16-3II	WHF-16-4I	WHF-16-6I	WHF-16-7I
Sample Identifier:	16G00202	16G00302	16G00303	16G00402	16G00602	16G00702
Date Sampled:	22-JUL-97	22-JUL-97	22-JUL-97	22-JUL-97	23-JUL-97	25-JUL-97
Laboratory Sample No.:	WTME322004	WTME3322004	WTME322003	NA	WTME340004	WTME348002
Inorganic Analytes ($\mu g/\ell$)						
Aluminum	--	--	222	NS	200 J	202
Antimony	--	--	17.4 J	NS	--	--
Arsenic	--	--	--	NS	--	--
Barium	45.2 J	25.3 J	26.6 J	NS	30.9 J	17.1 J
Beryllium	--	--	--	NS	--	--
Cadmium	--	--	--	NS	--	--
Calcium	3,660 J	997 J	1,380 J	NS	1,070 J	1,210 J
Chromium	--	--	--	NS	--	--
Cobalt	--	--	--	NS	--	--
Copper	--	--	--	NS	--	--
Cyanide	--	--	--	NS	--	--
Iron	--	--	1,370	NS	--	526
Lead	--	--	--	NS	--	--
Magnesium	3,020 J	790 J	1,220 J	NS	985 J	673 J
Manganese	21.8	18	89.6	NS	10.9 J	34.3
Nickel	--	--	--	NS	--	--
Potassium	--	1,180 J	--	NS	--	--
Sodium	4,300 J	3,470 J	3,940 J	NS	2,720 J	3,880 J
Vanadium	--	--	--	NS	--	--
Zinc	--	--	--	NS	--	--

See notes at end of table.

Table 5-23 (Continued)
Inorganic Analytes Detected in Site 16 Groundwater Samples, Phase IIB
July 1997

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	Deep Monitoring Wells				
Location Identifier:	WHF-16-2D	WHF-16-3D	WHF-16-3D	WHF-16-4D	WHF-16-7D
Sample Identifier:	16G00203	16G00304	16G00304F	16G00403	16G00703
Date Sampled:	23-JUL-97	24-JUL-97	24-JUL-97	22-JUL-97	25-JUL-97
Laboratory Sample No.:	WTME322005	WTME340006	WSME340007	NA	WEME348003
Inorganic Analytes ($\mu g/\ell$)					
Aluminum	121 J	1,900	98.4 J	NS	--
Antimony	--	--	--	NS	--
Arsenic	--	--	1.4 J	NS	3.6 J
Barium	17.4 J	16 J	11 J	NS	16.6 J
Beryllium	--	--	--	NS	--
Cadmium	--	--	--	NS	--
Calcium	1,080 J	2,960 J	2,540 J	NS	3,080 J
Chromium	--	--	--	NS	--
Cobalt	--	--	--	NS	--
Copper	--	11.9 J	--	NS	--
Cyanide	--	--	--	NS	--
Iron	--	1,040	--	NS	1,200
Lead	--	--	--	NS	--
Magnesium	659 J	1,220 J	1,030 J	NS	818 J
Manganese	41.4	105	80.4	NS	170
Nickel	--	--	--	NS	8.2 J
Potassium	--	2,010 J	1,720 J	NS	--
Sodium	2,080 J	20,400	20,700	NS	2,680 J
Vanadium	--	--	--	NS	--
Zinc	--	26.7	--	NS	--

Notes: Dup = duplicate sample.
F = filtered sample.
NA = not applicable.
$\mu g/\ell$ = micrograms per liter.
-- = compound not detected.
NS = Not resampled for inorganic analysis.
J = estimated value.

Table 5-24
Summary of Organic Compounds Detected in Site 16 Groundwater Samples

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Analyte	Frequency of Detection[1]	Range of Detected Analyte Concentration[2]	Mean Analyte Concentration	Background Screening Values[3]	Federal MCLs[4]	Florida Groundwater Cleanup Target Level	
						Concentration[5]	Basis[6]
__Volatile Organic Compounds__ ($\mu g/\ell$)							
1,2-Dichloroethane	6/17	1 to 32	19	--	5	3	P
1,2-Dichloroethene (total)	6/17	1 to 50	16.5	--	70	70	P
Benzene	7/17	1 to 820	428	--	5	1	P
Chloroform	3/17	1	1	--	0.1	5.7	
Ethylbenzene	2/17	5 to 6	5.5	--	700	30	S
Toluene	2/17	1	1	--	1,000	40	S
Trichloroethene	5/17	2 to 7	3.8	--	5	3	P
Xylenes (total)	1/17	1	1	--	10,000	20	S
__Semivolatile Organic Compounds__ ($\mu g/\ell$)							
Naphthalene	3/17	1	1	--	NA	20	
Phenol	3/17	4 to 8	5.7	--	NA	10	
bis(2-Ethylhexyl)phthalate	7/17	1 to 53	9.5	--	6	6	P
__Pesticides and PCBs__ ($\mu g/\ell$)							
4,4'-DDT	2/17	0.14 to 0.15	0.15	--	NA	0.1	

See notes at end of table.

Table 5-24 (Continued)
Summary of Organic Compounds Detected in Site 16 Groundwater Samples

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[1] Frequency of detection is the fraction of total samples analyzed in which the analyte was detected.
[2] Value indicated by an asterisk is the average of the sample and its duplicate. If the target analyte was not detected in either the environmental sample or associated duplicate, the value used for the nondetection is one-half the reporting limit.
[3] Background screening values for organic compounds are the arithmetic mean concentrations; for inorganic analyte, it is two times the arithmetic mean concentration. The latter values are used for analyte screening in risk assessment.
[4] Federal MCLs are maximum permissible concentrations of contaminants in water delivered to a user by a public water system.
[5] Source: Cleanup Target Levels, Chapter 62-777, FAC (FDEP, 1999).
[6] The concentrations are based on a number of enforceable and nonenforceable State of Florida regulations:
P = primary drinking water standards based on Florida Administrative Code (FAC) Rule 17-550.310, .320
S = secondary drinking water standards based on FAC Rule 17-550.310, .320

Notes: MCL = maximum contaminant level.
$\mu g/\ell$ = micrograms per liter.
Bold indicates analyte exceeded cleanup target level.
-- = compound not detected.
NA = criteria not available.
PCB = polychlorinated biphenyl.
DDT = dichlorodiphenyltrichloroethane.

Table 5-25
Summary of Inorganic Analytes Detected in Site 16 Groundwater Samples

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Analyte	Frequency of Detection[1]	Range of Detected Analyte Concentration[2]	Mean Analyte Concentration	Background Screening Values[3]	Federal MCLs[4]	Florida Groundwater Cleanup Target Level	
						Concentration[5]	Basis[6]
<u>Inorganic Analytes</u> (µg/ℓ)							
Aluminum	10/17	121 to 3,930	796	654	[8]200	200	S
Antimony	1/17	17.4	17.4	20.4	6	6	P
Arsenic	4/17	0.6 to 3.6	1.5		50	50	P
Barium	17/17	10* to 456	53.9	72.6	2,000	2,000	P
Beryllium	1/17	0.42	0.42	0.58	4	4	P
Cadmium	2/17	2.2 to 12.5	7.4	4.4	5	5	P
Calcium	15/17	623 to 78,800	16,462	3,316	NA	NA	
Chromium	4/17	2.1 to 4.6	2.9	30	100	100	P
Cobalt	2/17	2.175* to 3	2.6	--	NA	420	
Copper	6/17	1.4 to 11.9	4.2	10.8	[8]1,000	1,000	S
Iron	14/17	7.25* to 68,600	5,538	964	[8]300	300	S
Lead	4/17	0.5 to 5.7	3.1	--	[7]15	15	P
Magnesium	17/17	268.5* to 8,690	1,841	2,426	NA	NA	
Manganese	17/17	1.3* to 1,370	188	42.8	[8]50	50	S
Nickel	3/17	7.7 to 8.7	8.2	42.8	100	100	P
Potassium	13/17	322 to 4,790	1,600	1,530	NA	NA	
Sodium	17/17	1,500* to 20,400	4,466	4,770	[9]NA	160,000	P
Vanadium	4/17	1.3 to 25.2	7.6	3.8	NA	49	T
Zinc	8/17	26.7 to 381	138	200	[8]5,000	5,000	S
Cyanide	1/17	12	12	7	200	200	P

See notes at end of table.

Table 5-25 (Continued)
Summary of Inorganic Analytes Detected in Site 16 Groundwater Samples

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[1] Frequency of detection is the fraction of total samples analyzed in which the analyte was detected.
[2] Value indicated by an asterisk is the average of the sample and its duplicate. If the target analyte was not detected in either the environmental sample or associated duplicate, the value used for the nondetection is one-half the reporting limit.
[3] Background screening values for organic compounds are the arithmetic mean concentrations; for inorganic analytes it is two times the arithmetic mean concentration. The latter values are used for analyte screening in risk assessment.
[4] Federal MCLs are maximum permissible concentrations of contaminants in water delivered to a user by a public water system.
[5] Source: Cleanup Target Levels, Chapter 62-777, FAC (FDEP, 1999).
[6] The concentrations are based on a number of enforceable and nonenforceable State of Florida regulations:
P = primary drinking water standards based on Florida Administrative Code (FAC) Rule 17-550.310, .320
S = secondary drinking water standards based on FAC Rule 17-550.310, .320
T = systemic toxicants based on FAC Rule 17-520.400 (1) (d)
[7] Treatment technique requirement for drinking water distribution system.
[8] Secondary MCL.
[9] No MCL has been determined for sodium but a reporting limit of 20,000 $\mu g/\ell$ has been established.

Notes: MCL = maximum contaminant level.
$\mu g/\ell$ = micrograms per liter.
Bold indicates analyte exceeded cleanup target level.
NA = no applicable standard currently exists.
* = average of a sample and its duplicate.
-- = criteria not available.

Aluminum exceeded the Federal and State secondary MCL (200 µg/ℓ) in two monitoring wells ranging in concentration from 749 to 3,930 µg/ℓ (16G00301 [749 µg/ℓ], and 16G00601 [3,040 to 3,930 µg/ℓ]) 1996 and 1997, respectively.

Antimony exceeded the Federal and State MCL (6 µg/ℓ) in sample 16G00601F, which had a concentration of 124 µg/ℓ. The corresponding unfiltered sample and the 1996 samples of the source monitoring wells did not have any antimony present.

Beryllium exceeded the Federal and State MCL (4 µg/ℓ) in sample 16G00601F, which had a concentration of 10.3 µg/ℓ but was not detected in the unfiltered sample 16G00601.

Cadmium exceeded the Federal and State MCL (5 µg/ℓ) in sample 16G00401, which had a concentration of 12.5 µg/ℓ.

Iron exceeded the Federal and State MCL (300 µg/ℓ) in samples from four monitoring wells ranging in concentration from 1,040 to 68,600 µg/ℓ (16G00301 [176 to 1,040 µg/ℓ], 16G00601 [45,200 to 68,600 µg/ℓ] and 16G00701 [328 to 1,770 µg/ℓ]).

Manganese exceeded the Federal and State MCLs (50 µg/ℓ) in samples from three monitoring wells ranging in concentration from 65.4 to 1,370 µg/ℓ (16G00401 [65.4 µg/ℓ], 16G00601 [516 to 1,370 µg/ℓ] and 16G00701 [1,210 µg/ℓ]).

Intermediate Groundwater Samples. The following analytes were detected in groundwater samples in one or both sampling events (1996 and 1997) collected from monitoring wells screened at the intermediate level of the surficial water table.

<u>VOCs</u>. Eight VOCs (1,2-dichloroethane, 1,2-dichloroethene [total], benzene, chloroform, ethylbenzene, toluene, TCE, and xylenes [total]) were detected in the groundwater samples collected from the intermediate monitoring wells at Site 16.

1,2-Dichloroethane was detected in groundwater samples from three monitoring wells ranging in concentration from 1 to 24 µg/ℓ (16G00202 [0 to 24 µg/ℓ], 16G00303 [2 to 8 µg/ℓ], and 16G00402 [0 to 1 µg/ℓ]). Groundwater samples from 16G00202 and 16G00303 exceeded the Federal MCL of 5 µg/ℓ. Groundwater samples from 16G00202 and 16G00303 exceeded the Florida GCTL of 3 µg/ℓ for 1,2-dichloroethane.

1,2-Dichloroethene was detected in groundwater samples from three monitoring wells ranging in concentration from 1 to 50 µg/ℓ which is below the Florida GCTL and Federal MCL.

Benzene was detected in groundwater samples from four monitoring wells ranging in concentration from 0 to 820 µg/ℓ (16G00202 [750 to 820 µg/ℓ], 16G00303 [0 to 130 µg/ℓ], 16G00402 [0 to 28 µg/ℓ], and 16G00702 [39 µg/ℓ]). Groundwater samples from 16G00202, 16G00303, 16G00402, and 16G00702 exceeded both the Federal MCLs and the Florida GCTL for benzene of 5.0 and 1.0 µg/ℓ, respectively.

Chloroform was detected in groundwater samples from three monitoring wells (16G00202, 16G00302, and 16G00303) at a concentration of 1 µg/ℓ. These concentrations exceed the Federal MCL for chloroform of 0.1 µg/ℓ. Chloroform was not detected in groundwater samples from the same wells during other sampling events.

TCE was detected in groundwater samples from four monitoring wells ranging in concentration from 2 to 7 $\mu g/\ell$ (16G00202 [6 to 7 $\mu g/\ell$], 16G00303 [2 $\mu g/\ell$], 16G00402 [2 to 3 $\mu g/\ell$] and 16G00702 [at 5 $\mu g/\ell$]. TCE was detected at a concentration of 6 and 7 $\mu g/\ell$ in groundwater samples from 16G00202, which exceeded the Federal MCL of 5 $\mu g/\ell$. TCE equaled the Florida GCTL for TCE of 3.0 $\mu g/\ell$ in groundwater sample 16G00402.

SVOCs. Three SVOCs (naphthalene, phenol, and bis(2-ethylhexyl)phthalate) were detected in the groundwater samples collected from the intermediate monitoring wells at Site 16. None of the detected SVOCs were detected in background groundwater samples. Bis(2-ethylhexyl)phthalate was detected in groundwater samples 16G00202 and 16G00602 at concentrations of 1 and 6 $\mu g/\ell$, respectively. This concentration equals the Federal MCL and the Florida GCTL of 6 $\mu g/\ell$.

Pesticides. One pesticide (4,4'-DDT) was detected in a sample from 16G00602 at a concentration of 0.14 $\mu g/\ell$ which exceeds the Florida GCTL of 0.1 $\mu g/\ell$. No PCB compounds were detected in any Phase IIB intermediate depth groundwater samples.

Inorganic Analytes. Fourteen of the twenty inorganic analytes (aluminum, antimony, barium, calcium, chromium, copper, iron, lead, magnesium, manganese, potassium, sodium, vanadium, and zinc) were detected in intermediate groundwater samples collected from Site 16. Seven inorganic analytes (barium, calcium, iron, magnesium, manganese, sodium, and zinc) were detected at concentrations exceeding the background screening concentrations.

Four inorganic analytes (aluminum, antimony, iron, and manganese) were detected at concentrations exceeding either Federal or State regulatory limits as listed below.

Aluminum exceeded the Federal and State secondary MCLs (200 $\mu g/\ell$) in three monitoring wells ranging in concentration from 200 to 395 $\mu g/\ell$ (16G00303 [222 to 395 $\mu g/\ell$], 16G00602 [200 to 244 $\mu g/\ell$], and 16G00702 [202 $\mu g/\ell$]).

Antimony exceeds the Federal and State MCL (6 $\mu g/\ell$) in sample 16G00303, which had a concentration of 17.4 $\mu g/\ell$.

Iron exceeded the Federal and State MCL (300 $\mu g/\ell$) in two monitoring wells ranging in concentration from 396 to 1,410 $\mu g/\ell$ (16G00303 [1,370 to 1,410 $\mu g/\ell$] and 16G00702 [201 to 526 $\mu g/\ell$]).

Manganese exceeded the Federal and State MCL (50 $\mu g/\ell$) in three monitoring wells ranging in concentration from 60.3 to 896 $\mu g/\ell$ (16G00303 [60.3 to 89.6 $\mu g/\ell$], 16G00602 [10.9 to 70.8 $\mu g/\ell$] and 16G00702 [34.3 to 85 $\mu g/\ell$]).

Deep Groundwater Samples. The following analytes were detected in groundwater samples in one or both sampling events (1996 and 1997) collected from monitoring wells screened in the deeper level of the surficial water table.

VOCs. Five VOCs (1,2-dichloroethane, 1,2-dichloroethene [total], benzene, toluene, and TCE) were detected in the groundwater samples collected from monitoring wells screened in the deeper level at Site 16.

1,2-Dichloroethane was detected in groundwater samples from two monitoring wells ranging in concentration from 20 to 29 $\mu g/\ell$ (16G00403 [0 to 29 $\mu g/\ell$] and 16G00703

[0 to 20 $\mu g/\ell$]). Groundwater samples from 16G00403 and 16G00703 exceeded the Federal MCLs and Florida GCTL of 5 and 3 $\mu g/\ell$, respectively.

1,2-Dichloroethene was detected in groundwater samples from two monitoring wells ranging in concentration from 1 to 10 $\mu g/\ell$ (16G00403 [0 to 1 $\mu g/\ell$] and 16G00703 [10 $\mu g/\ell$]) which is below State and Federal regulatory limits of 70 $\mu g/\ell$.

Benzene was detected in groundwater samples from three monitoring wells ranging in concentration from 0 to 760 $\mu g/\ell$ (16G00203 [1 to 5 $\mu g/\ell$], 16G00403 [0 to 760 $\mu g/\ell$], and 16G00703 [0 to 520 $\mu g/\ell$]). Groundwater samples from 16G00403 and 16G00703 exceeded the Federal MCLs and Florida GCTL for benzene, which are 5 and 1.0 $\mu g/\ell$, respectively.

Toluene was detected in one groundwater sample from monitoring wells 16G00203 at a concentration of 1 $\mu g/\ell$. This concentration dose not exceed State and Federal regulatory limits.

TCE was detected in one groundwater sample, 16G00703, at a concentration of 2 $\mu g/\ell$ which is below State and Federal regulatory limits.

None of the remaining VOCs were detected at concentrations exceeding the Federal or State regulatory limits.

SVOCs. Three SVOCs (naphthalene, phenol, and bis(2-ethylhexyl)phthalate) were detected in groundwater samples collected from monitoring wells screened in the deep surficial aquifer at Site 16. None of the detected SVOCs were found in background groundwater samples. Naphthalene and phenol were not detected at concentrations that exceeded either Federal MCLs or the Florida GCTLs.

Bis(2-ethylhexyl)phthalate was detected in two groundwater samples, 16G00304 and 16G00403, at concentrations of 53 and 1 $\mu g/\ell$, respectively. The groundwater sample from 16G00304 exceeds both the Federal MCL and the Florida groundwater guidance concentration 6 $\mu g/\ell$.

Pesticides. No pesticides or PCB compounds were detected in any groundwater samples collected from monitoring wells screened in the deeper level of the surficial aquifer.

Inorganic Analytes. Fifteen of the twenty inorganic analytes (aluminum, arsenic, barium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, and zinc) were detected in deep groundwater samples collected from Site 16. Seven inorganic analytes (aluminum, copper, iron, lead, manganese, potassium, and sodium) were detected at concentrations exceeding the background screening concentrations.

Three inorganic analytes (aluminum, iron, and manganese) were detected at concentrations exceeding either Federal or State regulatory limits as listed below.

Aluminum exceeded the Federal and State secondary MCLs (200 $\mu g/\ell$) in two monitoring wells ranging in concentration from 278 to 1,900 $\mu g/\ell$ (16G00304 [90.7 to 1,900 $\mu g/\ell$] and 16G00403 [278 $\mu g/\ell$]).

Iron exceeded the Federal and State secondary MCLs (300 $\mu g/\ell$) in three monitoring wells ranging in concentration from 1,040 to 1,370 $\mu g/\ell$ (16G00304 [111 to 1,040 $\mu g/\ell$] 16G00403 [1,370 $\mu g/\ell$], and 16G00703 [170 $\mu g/\ell$]).

Manganese exceeded the Federal and State secondary MCLs (50 $\mu g/\ell$) in two monitoring wells ranging in concentration from 73.7 to 170 $\mu g/\ell$ (16G00304 [73.7 to 105 $\mu g/\ell$] and 16G00703 [102 to 170 $\mu g/\ell$]).

Filtered Groundwater Samples. Filtered samples for inorganics (metals only) were collected from monitoring wells 16G00201F, 16G00501F, 16G00601F, 16G00303F, and 16G00304F for comparison purposes only during the Phase IIB RI (denoted with F suffix, Tables 5-22, 5-23). Comparison of the analytical results between the filtered sample and the corresponding unfiltered sample indicates that in general, fewer analytes are detected in the filtered samples. In addition, analyte concentrations in the filtered sample are typically lower than the corresponding concentrations in the unfiltered sample. Filtered groundwater data was not used to make decisions as part of the Baseline Risk Assessment in Chapters 6.0 and 7.0 of this report.

6.0 HUMAN HEALTH RISK ASSESSMENT

A human health risk assessment (HHRA) has been conducted as part of the RI/FS for Site 16 at NAS Whiting Field. The purpose of the HHRA is to characterize the risks associated with the hypothetical exposures to site-related chemicals. This HHRA is conducted in accordance with the following guidance documents:

- *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A)* (USEPA, 1989a),
- *Guidance for Data Useability in Risk Assessment (Part A), Final* (USEPA, 1992a), and
- *Supplemental Guidance to RAGs: Region IV Bulletins, Human Health Risk Assessment* (USEPA, 1995a).

Additionally, the HHRA will consider FDEP guidance:

- Cleanup Target Levels for Chapter 62-777, FAC (FDEP, 1999),

The methodology for the HHRA is described in Chapter 2.0 of the GIR (HLA, 1998). The HHRA methodology presented in the GIR (HLA, 1998) consists of the following steps:

- data evaluation,
- selection of chemicals of potential concern,
- exposure assessment,
- toxicity assessment, and
- risk characterization.

Site 16 is located southeast of Clear Creek at NAS Whiting Field. The location, physical description, and history associated with Site 16 are described in Chapter 1 of the this report. During the RI, surface soil, subsurface soil, groundwater, and surface water were collected from Site 16. Sampling locations and the sampling rationale are presented in Chapter 3 of this report.

6.1 DATA EVALUATION. The data evaluation involves numerous activities, including sorting data by medium, evaluating sample quantitation limits, and evaluating quality of data with respect to qualifiers.

The data for Sites 16 were divided into the following categories: surface soil, subsurface soil, groundwater, and surface water and background for each media.

Sample quantitation limits (SQLs) are compared to USEPA Region III RBCs, and Florida screening values. Surface and subsurface soil SQLs were compared to Region III RBCs and Florida SCTLs for residential and industrial scenarios, respectively. Groundwater SQLs were compared to Florida GCTLs and Region III Tap Water RBCs. Surface water SQLs were compared to Florida Cleanup Target Levels and Region IV Water Quality standards. Analyte-specific SQLs that are above RBCs and Florida screening values are identified and discussed in the uncertainty analysis.

The quality of the data was evaluated with respect to the data qualifiers. Only data of sufficient quality were retained for evaluation in this HHRA. The HHRA considers data with "J", "U", and "UJ" qualifiers as well as data with no qualifier.

6.2 SELECTION OF HUMAN HEALTH CHEMICALS OF POTENTIAL CONCERN. The human health chemicals of potential concern (HHCPCs) were selected per the methodology described in Section 2.5 of the GIR (HLA, 1998). This HHCPC methodology considers (1) frequency of detection, (2) consistency with background conditions, (3) a comparison to regulatory and risk-based screening values, and (4) a comparison to essential nutrient levels.

In selecting HHCPCs, USEPA Region IV criteria were used (USEPA, 1995a). For each medium, the following criteria were employed to exclude detected analytes from the list of HHCPCs. Each criterion by itself is justification for excluding the analyte.

Less than 5 Percent Frequency of Detection. If an analyte has a frequency of detection (number of samples in which the analyte is detected divided by the number of samples analyzed for that analyte) less than 5 percent (USEPA, 1995a) and is not selected as an HHCPC in another medium, it is not selected as an HHCPC. This criterion is not used if there are less than 20 environmental samples for a specific medium.

Less than Background Screening Concentrations. If the maximum detected concentration of an analyte is less than twice the arithmetic mean of the background concentration (inorganics only), the analyte is not selected as an HHCPC (USEPA, 1995a). The background screening values for surface soil, subsurface soil, groundwater, and surface water are identified in below.

- A representative surface soil background data set consisting of Troup Loamy Sand and Lakeland Sand is used for background screening of Site 16 surface soil samples. Sample locations are identified on Figure 3-10 and are discussed in Subsection 3.3.1 of the GIR (HLA, 1998). The background surface soil data used for screening surface soils at Site 16 are presented in Tables 3-8 and 3-10 of the GIR (HLA, 1998).

- Background subsurface soil sample locations are identified on Figure 3-11 and discussed in Subsection 3.3.2 of the GIR (HLA, 1998). Tables 3-15 through 3-17 of the GIR (HLA, 1998) present the background screening data and Table 3-18 presents summary statistics for screening subsurface soil at Site 16.

- Background groundwater sample locations are identified on Figure 3-12 and discussed in Subsection 3.3.3 of the GIR (HLA, 1998). Tables 3-21 through 3-23 of the GIR (HLA, 1998) present background screening data for groundwater. Table 3-24 of the GIR (HLA, 1998) presents the summary statistics used for screening the groundwater at Site 16.

- Surface water locations are identified on Figure 3-13 and are discussed in Paragraph 3.3.2.1 of the GIR (HLA, 1998). Table 3-19 of the GIR (HLA, 1998) presents summary statistics and the background screening data value used in the Site 16 HHRA surface water evaluation.

Less than Risk-Based Screening Concentrations, Standards, and Guidelines. If the maximum detected concentration of the analyte in a medium is less than its corresponding USEPA Region III RBC values (USEPA, 1996a), and less than Federal and Florida standards, the analyte is not selected as an HHCPC (USEPA, 1995a). The target hazard quotient in the USEPA Region III RBC table is 1 and the target cancer risk is 1×10^{-6}. All RBCs based on noncarcinogenic effects are adjusted for a target hazard quotient of 0.1 per Region IV guidance (USEPA, 1995a).

The residential soil RBCs are used for surface soil and the industrial soil RBCs are used for subsurface soil. No RBC is available for lead in soil due to a lack of toxicity data. Based on a USEPA recommendation, a screening level of 400 milligrams per kilogram (mg/kg) for lead under residential land use is used as the RBC for lead in soil (USEPA, 1994c). The maximum detected concentrations of analytes in surface soil are also compared to residential Florida SCTLs (FDEP, 1999). The maximum detected concentration of any organic analyte in surface soil that was also detected in groundwater (above a standard or guideline) is compared to the Florida leaching value (FDEP, 1999) for that analyte.

Tap water RBCs (USEPA, 1997a), Federal MCLs (USEPA, 1996b) and Florida Groundwater GCTLs (FDEP, 1999) are used for groundwater.

Florida Surface Water Cleanup Target Levels (freshwater) (FDEP, 1996b), and Region IV Water Quality Standards for human health consumption of water and organisms (USEPA, 1996b) are used to screen surface water. Tap water RBCs (USEPA, 1997a) are used when a Florida or Federal water quality standard is not available.

Less than Essential Nutrient Screening Values. If the maximum detected concentration of an essential nutrient in a medium is below a toxic level and consistent with or only slightly above its background concentration, the essential nutrient is not selected as an HHCPC. The derivation of essential nutrient screening values is presented in Appendix C-1 of the GIR (HLA, 1998).

HHCPCs were not screened using the iron essential nutrient value; the RBC was used instead. However, if iron is determined to be a risk driver, a comparison of the risk concentrations against the essential nutrient level for iron will be presented in the uncertainty section for that medium.

If the analyte meets any of the above criteria, is not a member of the same chemical class as other HHCPCs in the medium, and is not a breakdown product of other HHCPCs in the medium, then the analyte is not selected as an HHCPC. In situations where multiple screening values are available, a chemical is excluded only if its maximum screening concentration is less than all of the corresponding screening values. Appendix G (Tables G-1 through G-4) presents the RBCs, regulatory guidance values, and applicable or relevant and appropriate requirement (ARARs) that are used in HHCPC selection. After applying these criteria with professional judgment, HHCPCs are identified for each medium. HHCPC selection for each media is presented below in Subsections 6.2.1 through 6.2.4.

6.2.1 Surface Soil Twenty samples and two duplicates were collected from Site 16 (specific samples that are included in the HHRA are listed in the footnotes of Table 6-1). The samples locations are presented on Figures 3-1 and 5-11. VOCs, SVOCs, pesticides, PCBs, and inorganic data from all of these samples are evaluated in this HHRA. Table 6-1 identifies eight PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene), one pesticide (dieldrin) and six inorganic analytes (aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, and vanadium) as HHCPCs for surface soil at Site 16.

Barium, chromium, copper, and vanadium were recently added as HHCPCs due to changes in the USEPA Region III RBCs and Florida Cleanup Target Levels. Barium was detected in one sample above the Florida SCTL of 110 mg/kg, but was below the RBC of 550 mg/kg. Chromium was detected above the RBC of 23 mg/kg in two samples, but was below the SCTL of 210 mg/kg. Copper was detected in two soil samples above the SCTL of 110 mg/kg but was below the RBC of 310 mg/kg. Vanadium was detected above the SCTL in nine samples but all detections were below the RBC of 55 mg/kg. Barium, chromium, copper, and vanadium were not carried through the remainder of the HHRA, but will be addressed in the feasibility study as HHCPCs.

<u>6.2.2 Subsurface Soil</u> Five subsurface soil samples (16-SS-06-04, 16-SS-10-05, 16SS0201, 16SS0302, and 16SS0403) and a duplicate sample (16SS0403A) were collected from Site 16 (Figure 3-4). The analytical data are presented in Tables 5-12 and 5-13. VOCs, SVOCs, pesticides, PCBs, and inorganic data from these sample are evaluated in this HHRA. Table 6-2 identifies three inorganic analytes (arsenic, iron, and lead) as HHCPCs for subsurface soil at Site 16.

<u>6.2.3 Surface Water</u> One surface water sample (16W00101) was collected from Site 16 (Figure 3-4). The analytical data are presented in Table 5-16. VOCs, SVOCs, pesticides, PCBs, and inorganic data from this sample are evaluated in this HHRA. As shown in Table 6-3, only aluminum and beryllium were identified as HHCPCs in surface water.

Aluminum was recently added as an HHCPC due to changes in the Florida Cleanup Target Levels. Aluminum was not carried through the remainder of the HHRA, but will be addressed in the feasibility study as needed.

<u>6.2.4 Groundwater</u> Seventeen groundwater samples and three duplicates were collected from Site 16 (samples that are evaluated in the HHRA are identified in the notes of Table 6-4). The sample locations are presented on Figure 3-2. The analytical data are presented in Tables 5-20 through 5-23. VOCs, SVOCs, pesticides, PCBs, and inorganic data from these samples are evaluated in this HHRA.

The groundwater data were managed in a tiered manner. The data for each analyte from the most recent sampling event at each sampling location were used in the HHRA unless the analyte was not detected in the most recent data set but was detected previously. If the analyte was detected in a previous sampling event then those data were evaluated in the HHRA.

Table 6-4 identifies five VOCs (1,2-dichloroethane, 1,2-dichloroethene [total], benzene, chloroform, TCE; one SVOC (bis(2-ethylhexyl)phthalate), one pesticide (4,4'-DDT), and six inorganics (aluminum, arsenic, barium, cadmium, iron, and manganese) as HHCPCs for groundwater in Site 16.

Table 6-1
Selection of Human Health Chemicals of Potential Concern for Surface Soil

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range[2]	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Volatile Organic Compounds (μg/kg)								
Toluene	1/20	6 to 13	1	1	NA	380,000	No	F, S
Xylenes (total)	3/20	6 to 13	1 to 5	2.7	NA	5,900,000	No	S
Semivolatile Organic Compounds (μg/kg)								
Anthracene	1/20	350 to 420	95	95	NA	2,300,000	No	F, S
Benzo(a)anthracene	4/20	350 to 420	56 to 2,300	670	NA	870	Yes	
Benzo(a)pyrene	5/20	350 to 840	71 to 3,100	750	NA	87	Yes	
Benzo(b)fluoranthene	4/20	350 to 840	86 to 3,600	1,100	NA	870	Yes	
Benzo(g,h,i)perylene	3/20	350 to 420	120 to 1,200	600	NA	2,300	No	S
Benzo(k)fluoranthene	3/20	350 to 420	73 to 3,200	1,200	NA	8,700	Yes	C
bis(2-Ethylhexyl)phthalate	7/20	350 to 420	43 to 120*	70	NA	46,000	No	S
Carbazole	1/17	350 to 420	97	97	NA	32,000	Yes	C
Chrysene	5/20	350 to 420	54 to 3,200	740	NA	87,000	Yes	C
Dibenz(a,h)anthracene	2/20	350 to 420	110 to 700	410	NA	87	Yes	
Fluoranthene	4/20	350 to 420	59 to 2,300	680	NA	310,000	No	S
Indeno(1,2,3-cd)pyrene	4/20	350 to 420	62 to 1,900	570	NA	870	Yes	
Phenanthrene	2/20	350 to 420	52 to 440	250	NA	230,000	No	S
Pyrene	4/20	350 to 420	44 to 1,700	520	NA	230,000	No	S

See notes at end of table.

Table 6-1 (Continued)
Selection of Human Health Chemicals of Potential Concern for Surface Soil

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range[2]	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Pesticides and PCBs (µg/kg)								
4,4'-DDD	2/20	3.6 to 21	2.1 to 18	10	NA	2,700	No	S
4,4'-DDE	9/20	3.6 to 21	2.6* to 100	30	NA	1,900	No	S
4,4'-DDT	9/20	3.6 to 21	3.3* to 89	21	NA	1,900	No	S
Aroclor-1254	2/20	36 to 210	36 to 130	83	NA	320	No	S
Aroclor-1260	1/20	36 to 210	79*	79	NA	320	No	F, S
Dieldrin	8/20	3.6 to 21	2.5 to 130	31	NA	40	Yes	
alpha-Chlordane	3/20	1.8 to 99	1.6 to 9.4*	4.5	NA	1,800	No	S
gamma-Chlordane	3/20	1.8 to 99	1 to 6.0*	3.1	NA	1,800	No	S
Inorganic Analytes (mg/kg)								
Aluminum	20/20	NA	1,890* to 18,600	8,720	13,500	7,800	Yes	
Antimony	1/20	2.7 to 12	5.9	5.9	8	3.1	No	F, B
Arsenic	20/20	NA	0.7* to 12.1	2.8	[7]4.6	0.43	Yes	
Barium	20/20	NA	4.5* to 257	36.8	18.8	110	Yes	S
Beryllium	15/20	1	0.06 to 0.3*	0.12	0.36	16	No	B
Cadmium	17/20	0.61 to 1	0.21 to 7.6	1.3	0.98	3.9	Yes	
Calcium	20/20	NA	70.8 to 2,350	584	446	1,000,000	No	S
Chromium	20/20	NA	3.2 to 29.2	10.6	10	23	Yes	S
Cobalt	11/20	10	0.69 to 4.1	1.7	2.8	470	No	S
Copper	19/20	5	2.9 to 202	34.1	8	110	Yes	S

See notes at end of table.

Table 6-1 (Continued)
Selection of Human Health Chemicals of Potential Concern for Surface Soil

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range[3]	Mean of Detected Concentrations[4]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Inorganic Analytes (mg/kg) (Continued)								
Cyanide	8/20	0.24 to 0.5	0.12* to 0.51	0.2	0.28	30	No	S
Iron	20/20	NA	1,390* to 48,900	9,240	7,744	2,300	Yes	
Lead	20/20	NA	4.4 to 759	110	10.2	400	Yes	
Magnesium	20/20	NA	34.2* to 443	157	244	460,468	No	S
Manganese	20/20	NA	5.3* to 372	129	324	160	Yes	
Mercury	9/20	0.08 to 0.1	0.05 to 0.65	0.17	0.12	2.3	No	S
Nickel	11/20	2.4 to 8	2.3 to 26	7.2	6.8	110	No	S
Potassium	6/20	133 to 1,000	69.7 to 289*	159	177	1,000,000	No	S
Selenium	7/20	0.41 to 1	0.15 to 0.35*	0.21	0.46	39	No	S
Silver	6/20	0.33 to 2	0.87 to 7.1	2.8	0.7	39	No	S
Sodium	18/20	1,000	114 to 361	178	382	1,000,000	No	B, S
Thallium	2/20	0.46 to 2	0.13 to 0.18	0.16	1.16	5.5	No	B, S
Vanadium	20/20	NA	3.3* to 28.9	15.8	19	15	Yes	S
Zinc	20/20	NA	3.8* to 773	104	15.8	2,300	No	S

See notes at end of table.

Table 6-1 (Continued)
Selection of Human Health Chemicals of Potential Concern for Surface Soil

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[5] For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium), the lesser of the U.S. Environmental Protection Agency (USEPA) Region III Risk-Based Concentration (RBC) table for residential soil exposure per January 1993 guidance (*Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening*, EPA/903/R-93-001 [USEPA, 1993a]) or the Florida Soil Cleanup Target Levels residential scenario (FDEP, 1999) was used for screening. For analytes that are HHCPCs in groundwater, the Florida Soil Cleanup Target Levels based on leachability are used for screening. Values from the USEPA Region III RBC Tables are based on an excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Lead value is from the Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (Office of Solid Waste and Emergency Response Directive 9355.4-12 [USEPA, 1994c]). Values are presented in Appendix D of this RI report.
[6] Analyte was included or excluded from the risk assessment for the following reasons:
- B = the maximum detected concentration did not exceed the background screening concentration; therefore, the analyte will not be considered further.
- C = the analyte is a carcinogenic PAH and was selected as an HHCPC because one or more other carcinogenic PAHs were selected.
- F = the frequency of detection was less than 5 percent; therefore, the analyte will not be considered further.
- S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

[7] Arsenic background number is presented in Appendix I of the GIR.

Notes: Samples: 16-SL-01, 16-SL-02, 16-SL-03, 16S00101, 16S00201, 16S00301, 16S00401, 16S00501, 16S00601, 16S00601DL (all but benzo(a)pyrene and benzo(b)fluoranthene), 16S00701, 16S00801, 16S00801RE, 16S00901 (all but semivolatiles), 16S00901R (semivolatiles only), 16S01001, 16S01101, 16S01201, 16S01301, 16S01401, 16S01501, 16S01601, and 16S01701.
Duplicate samples: 16S00101D and 16S01001D.
Background samples: BKG-SL-01, BKG-SL-02, BKG-SL-06, BKG-SL-07, BKG-SL-08, BKG-SL-09, BKG-SL-10, BKS00101, BKS00201, BKS00401, and BKS00501.
Background duplicate sample: BKG-SL-09A, BKS00201D.

HHCPC = human health chemical of potential concern.
μg/kg = micrograms per kilogram.
NA = not applicable.
* = average of sample and its duplicate.
PCB = polychlorinated biphenyl.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyltrichloroethane.
mg/kg = milligrams per kilogram.

Table 6-2
Selection of Human Health Chemicals of Potential Concern for Subsurface Soil at Site 16

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range[2]	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
<u>Volatile Organic Compounds</u> (μg/kg)								
Acetone	1/5	11 to 145	87	87	NA	5,500,000	No	S
2-Butanone	1/5	11 to 12	19	19	NA	21,000,000	No	S
Carbon disulfide	5/5	NA	1 to 26	9.6	NA	1,400,000	No	S
Ethylbenzene	1/5	11 to 12	4*	4	NA	8,400,000	No	S
Methylene chloride	1/5	19 to 120	87*	87	NA	23,000	No	S
Toluene	1/5	11 to 12	1	1	NA	2,600,000	No	S
Xylenes (total)	5/5	NA	2 to 11	5.2	NA	40,000,000	No	S
<u>Semivolatile Organic Compounds</u> (μg/kg)								
2-Methylnaphthalene	1/5	370 to 415	39	39	NA	560,000	No	S
Acenaphthene	1/5	370 to 415	77	77	NA	12,000,000	No	S
Benzo(a)pyrene	1/5	370 to 415	44	44	NA	500	No	S
Benzo(b)fluoranthene	1/5	370 to 415	77	77	NA	4,800	No	S
Benzo(k)fluoranthene	1/5	370 to 415	48	48	NA	52,000	No	S
Fluoranthene	2/5	370 to 415	120 to 270	200	NA	8,200,000	No	S
Fluorene	1/5	370 to 415	110	110	NA	8,200,000	No	S
Naphthalene	1/5	370 to 415	39	39	NA	270,000	No	S
Phenanthrene	2/5	370 to 415	58 to 340	200	NA	6,100,000	No	S
Pyrene	2/5	370 to 415	77 to 190	130	NA	6,100,000	No	S
bis(2-Ethylhexyl)phthalate	2/5	370 to 415	39 to 150	95	NA	280,000	No	S

See notes at end of table.

Table 6-2 (Continued)
Selection of Human Health Chemicals of Potential Concern for Subsurface Soil at Site 16

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range[2]	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
<u>Pesticides</u> (μg/kg)								
4,4'-DDD	3/5	3.7 to 8	2.2 to 36	14	NA	18,000	No	S
4,4'-DDE	3/5	3.7 to 8	1.8 to 83	38	NA	13,000	No	S
4,4'-DDT	2/5	3.7 to 8	5.7 to 52	29	NA	11,000	No	S
Dieldrin	1/5	3.7 to 7.6	1.6	1.6	NA	300	No	S
<u>Inorganic Analytes</u> (mg/kg)								
Aluminum	5/5	NA	11,000 to 24,300*	17,000	27,834	200,000	No	B, S
Antimony	3/5	2.4 to 12	2.5 to 6.7	5	4.4	82	No	S
Arsenic	5/5	NA	1.5 to 15.1	7.2	6.2	3.7	Yes	
Barium	5/5	NA	20* to 175	77.6	15.8	14,000	No	S
Beryllium	5/5	NA	0.18 to 0.26*	0.21	0.26	410	No	B, S
Cadmium	3/5	0.67 to 1	2.4 to 9	6.7	0.92	100	No	B, S
Calcium	4/5	510 to 1,000	254 to 5,870	2,090	444	1,000,000	No	S
Chromium	5/5	NA	10.5 to 36.9	23.7	22.8	400	No	S
Cobalt	5/5	NA	1.1 to 9.6	3.7	1.48	12,000	No	S
Copper	5/5	NA	4.8 to 3,620	759	8.8	8,200	No	S
Cyanide	1/4	0.09 to 1	0.14	0.14	ND	4,100	No	S
Iron	5/5	NA	6,670 to 74,800	29,400	18,110	61,000	Yes	
Lead	5/5	NA	6.8 to 766	286	8.4	400	Yes	

See notes at end of table.

Table 6-2 (Continued)
Selection of Human Health Chemicals of Potential Concern for Subsurface Soil at Site 16

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range[2]	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Inorganic Analytes (mg/kg) (Continued)								
Magnesium	5/5	NA	198* to 586	344	272	460,468	No	S
Manganese	5/5	NA	47* to 638	261	42.6	4,100	No	S
Mercury	4/5	0.1 to 0.12	0.17 to 0.43	0.28	ND	26	No	S
Nickel	5/5	NA	3.4* to 35.9	14.5	5	4,100	No	S
Potassium	4/5	153 to 1,000	166 to 412	287	181	1,000,000	No	S
Silver	3/5	0.46 to 2	0.79 to 4.3	2.8	1.12	1,000	No	S
Sodium	4/5	224 to 1,000	207 to 514	324	ND	1,000,000	No	S
Vanadium	5/5	NA	19 to 65.4*	31.3	45	1,400	No	S
Zinc	5/5	NA	10.6 to 895	316	15.6	61,000	No	S

See notes at end of table.

Table 6-2 (Continued)
Selection of Human Health Chemicals of Potential Concern for Subsurface Soil at Site 16

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[5] For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium), lesser of the U.S. Environmental Protection Agency (USEPA) Region III Risk-Based Concentration (RBC) table for industrial soil exposure per January 1993 guidance (*Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening*, EPA/903/R-93-001) or Florida Soil Cleanup Target Level industrial scenario (Florida Department of Environmental Protection, 1999) were used for screening. For analytes that are HHCPCs in groundwater, the Florida Soil Cleanup Target Levels based on leachability are used for screening. Actual values are taken from the USEPA Region III RBC Tables, and are based on an excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Lead value is from the Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (Office of Solid Waste and Emergency Response Directive 9355.4-12 [USEPA, 1994c]). Values are presented in Appendix D of this RI report.
[6] Analyte was included or excluded from the risk assessment for the following reasons:
B = the maximum detected concentration did not exceed the background; therefore, the analyte will not be considered further.
S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 16-SS-06-04, 16-SS-10-05, 16SS0201, 16SS0302, and 16SS0403.
Duplicate sample: 16SS0403A.

Background samples: BKB00101, BKB00102, BKB00201, BKB00202, BKB00301, BKB00302, BKB00401, BKB00402, BKB00501, BKB00502, BKB00601, BKB00602, BKB00701, and BKB00702.
Background duplicate samples: BKB00401D, and BKB00602D.

HHCPC = human health chemical of potential concern.
µg/kg = micrograms per kilogram.
* = average of sample and its duplicate.
NA = not applicable.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyltrichloroethane.
mg/kg = milligrams per kilogram.
ND = not detected in any background sample.

Table 6-3
Selection of Human Health Chemicals of Potential Concern for Surface Water

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range (*)[2]	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Inorganic Analytes (μg/ℓ)								
Aluminum	1/1	NA	758	758	ND	13	Yes	
Barium	1/1	NA	28.6	28.6	48.8	2,000	No	B, S
Beryllium	1/1	NA	0.21	0.21	ND	0.13	Yes	
Calcium	1/1	NA	8,890	8,890	1,957	1,055,398	No	S
Iron	1/1	NA	730	730	828	300	No	B
Lead	1/1	NA	5.2	5.2	ND	15	No	S
Magnesium	1/1	NA	1,170	1,170	1,767	118,807	No	B, S
Manganese	1/1	NA	4.4	4.4	32.4	50	No	B, S
Potassium	1/1	NA	2,780	2,780	ND	297,016	No	S
Sodium	1/1	NA	1,120	1,120	4,060	396,022	No	B, S
Zinc	1/1	NA	29.2	29.2	ND	1,100	No	S

See notes at end of table.

Table 6-3 (Continued)
Selection of Human Health Chemicals of Potential Concern for Surface Water

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[5] For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium), the lesser of the U.S. Environmental Protection Agency (USEPA), Region IV Water Quality Standards or the Florida Surface Water Cleanup Target Levels (FDEP, 1999) is used for the screening concentration. If no water quality standard is available, then the USEPA Risk-Based Concentration (RBC) Table for tap water exposure per January 1993 guidance (*Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening*, EPA/903/R-93-001 [USEPA, 1993a]) was used for screening. Actual values are taken from the USEPA Region III RBC Tables dated October 1998, and are based on a excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1 (USEPA, 1997c). For the essential nutrients, screening values were derived based on recommended daily allowances. Values are presented in Appendices B-1 and B-2 of the General Information Report.
[6] Analyte was included or excluded from the risk assessment for the following reasons:

B = the maximum detected concentration did not exceed the background screening concentration; therefore, the analyte will not be considered further.
S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: The average of a sample and its duplicate is used for all table calculations.
Sample: 16W00101.
Duplicate sample: None.
Background samples: STA3SW01 and STA10SW01.

* indicates the average of a sample and its duplicate.
HHCPC = human health chemical of potential concern.
$\mu g/\ell$ = micrograms per liter.
NA = not applicable.
ND = not detected in any background samples.

Table 6-4
Selection of Human Health Chemicals of Potential Concern for Unfiltered Groundwater at Site 16

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range[2]	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Volatile Organic Compounds (μg/ℓ)								
1,2-Dichloroethane	6/17	10 to 50	1 to 32	19	NA	0.21	Yes	
1,2-Dichloroethene (total)	6/17	10 to 50	1 to 50	17	NA	5.5	Yes	
Benzene	7/17	10 to 50	1 to 820	430	NA	0.36	Yes	
Chloroform	3/17	10 to 40	1	1	NA	0.08	Yes	
Ethylbenzene	2/17	10 to 50	5 to 6	5.5	NA	130	No	S
Toluene	2/17	10 to 50	1	1	NA	75	No	S
Trichloroethene	5/17	10 to 50	2 to 7	3.8	NA	1.6	Yes	
Xylenes (total)	1/17	10 to 50	1	1	NA	1,200	No	S
Semivolatile Organic Compounds (μg/ℓ)								
Naphthalene	3/17	10	1	1	NA	20	No	S
Phenol	3/17	10	4 to 8	5.7	NA	10	No	S
bis(2-Ethylhexyl)phthalate	7/17	10	1 to 53	9.5	NA	4.8	Yes	
Pesticides (μg/ℓ)								
4,4'-DDT	2/17	0.1	0.14 to 0.15	0.15	NA	0.1	Yes	
Inorganic Analytes (μg/ℓ)								
Aluminum	10/17	14.65 to 200	121 to 3,930	796	654	50	Yes	
Antimony	1/17	8.6 to 60	17.4	17.4	20.4	1.5	No	B
Arsenic	4/17	0.5 to 10	0.6 to 3.6	1.5	ND	0.045	Yes	
Barium	17/17	NA	10* to 456	53.9	72.6	260	Yes	
Beryllium	1/17	0.3 to 5	0.42	0.42	0.94	0.016	No	B
Cadmium	2/17	1.2 to 5	2.2 to 12.5	7.4	4.4	1.8	Yes	

See notes at end of table.

Table 6-4 (Continued)
Selection of Human Health Chemicals of Potential Concern for Unfiltered Groundwater at Site 16

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Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range[2]	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
<u>Inorganic Analytes</u> (μg/ℓ) (Continued)								
Calcium	15/17	236.5 to 308	623 to 78,800	16,500	3,316	1,055,398	No	S
Chromium	4/17	2 to 10	2.1 to 4.6	2.9	30	18	No	B, S
Cobalt	2/17	1.15 to 50	2.2* to 3	2.6	ND	220	No	S
Copper	6/17	1.1 to 25	1.4 to 11.9	4.2	10.8	1,000	No	S
Cyanide	1/17	1.5 to 5.2	12	12	7	73	No	S
Iron	14/17	41.2 to 100	7.3* to 68,600	5,540	964	300	Yes	
Lead	4/17	0.5 to 3	0.5 to 5.7	3.1	ND	15	No	S
Magnesium	17/17	NA	269* to 8,690	1,840	2,426	118,807	No	S
Manganese	17/17	NA	1.3* to 1,370	188	42.8	50	Yes	
Nickel	3/17	7.3 to 40	7.7 to 8.7	8.2	42.8	73	No	B, S
Potassium	13/17	316 to 5,000	322 to 4,790	1,600	1,528	297,016	No	S
Sodium	17/17	NA	1,500* to 20,400	4,470	4,772	160,000	No	S
Vanadium	4/17	1.2 to 50	1.3 to 25.2	7.6	3.8	26	No	S
Zinc	8/17	1.5 to 20	26.7 to 381	138	200	1,100	No	S

See notes at end of table.

Table 6-4 (Continued)
Selection of Human Health Chemicals of Potential Concern for Unfiltered Groundwater at Site 16

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[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[5] For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium), the lesser of the U.S. Environmental Protection Agency (USEPA), Region III Risk-Based Concentration (RBC) table for tap water exposure per January 1993 guidance (*Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening*, EPA/903/R-93-001 [USEPA, 1993a]) or the Florida Groundwater Cleanup Target Levels (FDEP, 1999) was used for screening. Actual values are taken from the USEPA Region III RBC Tables dated October 1998, and are based on an excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1 (USEPA, 1997c). For the essential nutrients, screening values were derived based on recommended daily allowances. Values are presented in Appendix F.
[6] Analyte was included or excluded from the risk assessment for the following reasons:
B = the maximum detected concentration did not exceed the background screening concentration; therefore, the analyte will not be considered further.
S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: Samples: 16G00101, 16G00201, 16G00202 (except benzene), 16G00202DL (benzene only), 16G00203, 16G00301, 16G00302, 16G00303, 16G00304, 16G00401, 16G00402, 16G00403, 16G00501, 16G00601, 16G00602, 16G00701, 16G00702 (except benzene), 16G00703 (except benzene), 16G00702DL, 16G00703DL (benzene only).
Duplicate sample: 16G00501D, 16G00101D, 16G00401D.

Background samples: BKG00101 through BKG00103, BKG00201 through BKG00203, and BKG00301.
Background duplicate sample: BKG00101D.

HHCPC = human health chemical of potential concern.
$\mu g/\ell$ = micrograms per liter.
NA = not applicable.
DDT = dichlorodiphenyltrichloroethane.
ND = not detected in any background samples.
* = average of sample and its duplicate.

6.3 EXPOSURE ASSESSMENT. The exposure assessment methodology is described in Subsection 2.5.3 of the GIR (HLA, 1998). This process involves the following several steps:

- characterization of the exposure setting in terms of physical characteristics and the populations that may hypothetically be exposed to site-related chemicals;
- identification of potential exposure pathways and receptors; and
- quantification of exposure for each population in terms of the amount of chemical either ingested, inhaled, or absorbed through the skin from all complete or hypothetically complete (potential future) exposure pathways.

Summaries of hypothetical exposure pathways to chemicals detected at Site 16 are presented on Figure 6-1.

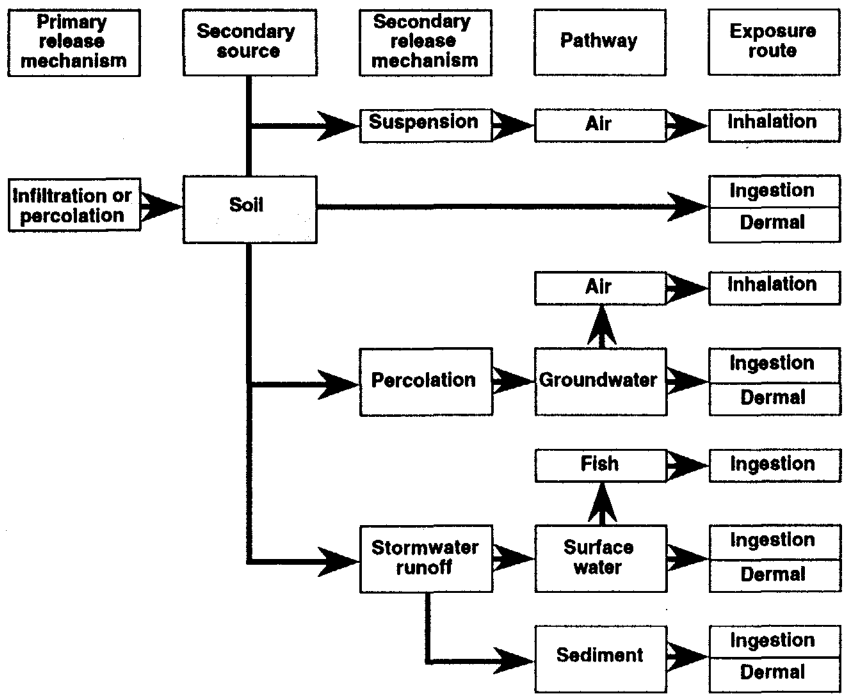
The hypothetical pathways including medium and route of exposure, the hypothetical exposed population, and the rationale for pathway selection or exclusion are provided in Table 6-5, and are described in more detail in Subsections 6.3.1 through 6.3.3. Receptor-specific exposure parameters for each exposure scenario are presented in Appendix G of the GIR (HLA, 1998). Risk calculation spreadsheets in Appendix G to this RI report also contain the assumptions for exposure parameters and quantitation of exposures.

6.3.1 Surface Soil No humans currently reside or work at Site 16. There is however, a current exposure potential for a trespasser (adult or adolescent) and a site maintenance worker. Therefore, these two receptors will be evaluated as a current exposure scenario.

Site 16 could be developed eventually for residential land use; therefore, the residential receptor will be evaluated as part of the hypothetical future land use scenario. Also, because there are no buildings at the site, exposure of occupational workers will be considered only as part of the future land use scenario. Other possible future exposure scenarios include excavation activities, such as installation of utility lines, and site maintenance, such as mowing the grass.

Exposures of hypothetical future residents (adult and child), hypothetical future occupational workers, current and hypothetical future site maintenance workers, hypothetical future excavation workers, and hypothetical current and future trespassers (adult and child) to surface soil contaminants through ingestion, dermal contact, and inhalation of particulates are evaluated in this HHRA.

6.3.2 Subsurface Soil There are no current exposures to subsurface soil because no excavation or construction activities are ongoing at Site 16. However, if Site 16 is developed for residential or industrial use or if hypothetical excavation activities occur in the future, an excavation worker could be exposed to contaminants in subsurface soil. Therefore, exposure of excavation workers or construction workers to contaminants in subsurface soil (incidental ingestion, dermal contact, and inhalation of fugitive dust) are evaluated in this HHRA.



Pathway	Exposure route	Current resident	Future resident	Site trespasser	Site worker	Excavation worker	Occupational worker
Air (suspension)	Inhalation		●	●	●	●	●
Soil	Ingestion		●	●	●	●	●
Soil	Dermal		●	●	●	●	●
Air	Inhalation		●				
Groundwater	Ingestion		●				
Groundwater	Dermal		●				
Fish	Ingestion						
Surface water	Ingestion		●	●			
Surface water	Dermal		●	●			
Sediment	Ingestion						
Sediment	Dermal						

NOTE:
NAS = Naval Air Station

FIGURE 6-1
SITE 16, COMPLETE AND POTENTIALLY COMPLETE EXPOSURE PATHWAYS FOR HUMAN RECEPTORS

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND BURN AREA

NAS WHITING FIELD
MILTON, FLORIDA

2534-09 FIG 6-1 FINAL RI SITE 16 111698 HAS

Table 6-5
Summary of Potential Exposure Pathways at Site 16

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Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Medium of Exposure	Route of Exposure	Potentially Exposed Population	Selected for Evaluation ?	Reason for Selection or Evaluation
Current Land Use				
Surface Soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Resident (adult and child) Trespasser (adult and adolescent) Occupational worker (adult) Site maintenance worker (adult) Excavation worker (adult)	No Yes No Yes No	No humans currently reside at Site 16. Adolescents and adults may be exposed to contaminants in the surface soil while trespassing. The site maintenance workers may be exposed to contaminants in surface soil while performing routine site activities.
Subsurface Soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Excavation worker (adult)	No	There are no excavation activities currently at Site 16.
Surface water	Ingestion and dermal contact with surface water.	Trespasser (adult and adolescent)	Yes	Adolescent and adult may be exposed to contaminants in surface water while trespassing.
Groundwater	Ingestion of groundwater as drinking water.	Resident (adult)	No	There are no current exposures to groundwater.

Table 6-5 (Continued)
Summary of Potential Exposure Pathways at Site 16

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Medium of Exposure	Route of Exposure	Potentially Exposed Population	Selected for Evaluation ?	Reason for Selection or Evaluation
Future Land Use				
Surface soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Resident (child and adult) Trespasser (adolescent and adult) Occupational worker (adult) Site maintenance worker (adult) Excavation worker (adult)	Yes Yes Yes Yes Yes	If Site 16 is developed for residential use, resident, trespassers, occupational worker, site maintenance worker and excavation worker could be exposed to chemicals in surface soil.
Subsurface soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Excavation worker (adult)	Yes	It is possible that an excavation worker could be exposed to subsurface soil in the future if the site is developed.
Surface Water	Ingestion and dermal contact with surface water	Resident (adult and child) Trespasser (adult and adolescent)	Yes Yes	If Site 16 is developed for residential use, residents could be exposed to contaminants in surface water. Trespassers could be exposed to chemicals in surface water while wading.
Groundwater	Ingestion of groundwater as drinking water and inhalation of volatiles while showering	Resident (adult and child)	Yes	If Site 16 is developed for residential use, drinking water wells in the surficial aquifer could be influenced by contaminants in the groundwater associated with Site 16. Therefore, future residents could be exposed to contaminants in the surficial aquifer.

6.3.3 Surface Water Currently, Site 16 is not used for any residential, occupational, or recreational purpose. Therefore, the only potentially complete exposure pathways are for trespassers (adult or adolescent). If in the future the site is developed, there would also be the potential for residents (adult or child) to be exposed. Additionally, site maintenance workers could be infrequently exposed if the site is developed. Therefore, hypothetical current and potential future trespasser and hypothetical potential future residents are evaluated in this HHRA as a worst case exposure scenario.

6.3.4 Groundwater Currently, groundwater at Site 16 is not used for any potable or nonpotable purpose, nor are there plans to use the water resource in the foreseeable future. However, in the event that Site 16 or areas hydraulically downgradient of Site 16 are developed, the exposure pathway to analytes in groundwater could become complete. Therefore, hypothetical future residential use of groundwater ingestion and inhalation of volatiles while showering (the showering scenario considers adult residents only) is evaluated in this HHRA as a worst-case estimate of hypothetical future receptors.

6.3.5 Exposure Point Concentrations (EPC) EPCs for all HHCPCs in surface soil, subsurface soil, surface water, and groundwater are calculated according to Paragraph 2.5.3.3 of the GIR (HLA, 1998). The EPC of each HHCPC is the lesser of the maximum detected concentration or the 95 percent upper confidence limit of the arithmetic mean concentration for soils and surface water. The EPC of each HHCPC in groundwater is the lesser of the maximum detected concentration and the arithmetic mean of the samples collected within the groundwater plume. This quantification process involves developing assumptions regarding exposure conditions and exposure scenarios for each receptor to estimate the total amount of contaminants that a hypothetical receptor may ingest, dermally absorb, or inhale from each exposure pathway. The ultimate goal of this step, as defined in USEPA guidance, is to identify the combination of these exposure variables or parameters that results in the most intense level of exposure that may "reasonably" be expected to occur under current and future site conditions (USEPA, 1989a).

The EPCs for HHCPCs in surface soil, subsurface soil, surface water, and groundwater for Site 16 are presented in Tables 6-6 through 6-9, respectively. The EPCs were used with receptor-specific exposure parameters to quantify exposures to the HHCPCs, as shown in the risk calculation spreadsheets in Appendix G to this report.

6.4 TOXICITY ASSESSMENT. The toxicity assessment methodology is described in Subsection 2.5.4 of the GIR (HLA, 1998). The toxicity assessment evaluates the available evidence on the hypothetical adverse effects associated with exposure to each HHCPC. This information is used to developed a relationship between the extent of exposure and the likelihood or severity of adverse human health effects. Two steps are typically associated with toxicity assessment: hazard identification and dose-response assessment.

- Hazard identification is the process of determining if exposure to an agent can cause a particular adverse health effect and, more importantly, if that effect will occur in humans. The objectives of the hazard identification in the HHRA are to (1) identify which of the contami-

Table 6-6
Exposure Point Concentrations for Human Health Chemicals of Potential Concern for Surface Soil at Site 16

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Analyte	Frequency of Detection[1]	Maximum Detected Concentration	95% UCL[2]	Exposure Point Concentration[3]
Semivolatile Organic Compounds (μg/kg)				
Benzo(a)anthracene	4/20	2,300	350	350
Benzo(a)pyrene	5/20	3,100	370	370
Benzo(b)fluoranthene	4/20	3,600	410	410
Benzo(k)fluoranthene	3/20	3,200	390	390
Carbazole	1/17	97	200	97
Chrysene	5/20	3,200	390	390
Dibenz(a,h)anthracene	2/20	700	240	240
Indeno(1,2,3-cd)pyrene	4/20	1,900	320	320
Pesticides and PCBs (μg/kg)				
Dieldrin	8/20	130	32	32
Inorganic Analytes (mg/kg)				
Aluminum	20/20	18,600	11,300	11,300
Arsenic	20/20	12.1	3.8	3.8
Cadmium	17/20	7.6	2.1	2.1
Iron	20/20	48,900	13,900	13,900
Lead	20/20	759	473	473
Manganese	20/20	372	296	296

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] 95% UCL of the arithmetic mean is calculated using all samples. One-half the contract-required quantitation limit/contract-required detection limit is used as a surrogate for nondetects. The UCL is not calculated when there are less than 10 total samples.
[3] Exposure point concentration is the lower of either the 95% UCL concentration or maximum detected concentration.

Notes: % = percent.
UCL = upper confidence limit (see footnote 2).
μg/kg = micrograms per kilogram.
PCB = polychlorinated biphenyl.
mg/kg = milligrams per kilogram.

Table 6-7
Exposure Point Concentrations for Human Health Chemicals of Potential Concern for Subsurface Soil

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Analyte	Frequency of Detection[1]	Maximum Detected Concentration	95% UCL[2]	Exposure Point Concentration[3]
Inorganic Analytes (mg/kg)				
Arsenic	5/5	15.1	NC	15.1
Iron	5/5	74,800	NC	74,800
Lead	5/5	766	NC	766

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] 95% UCL of the arithmetic mean is calculated using all samples. One-half the contract-required quantitation limit/contract-required detection limit is used as a surrogate for nondetects. The UCL is not calculated when there are less than 10 total samples.
[3] Exposure point concentration is the lower of either the 95% UCL concentration or maximum detected concentration.

Notes: % = percent.
UCL = upper confidence limit (see footnote 2).
mg/kg = milligrams per kilogram.
NC = not calculated.

Table 6-8
Exposure Point Concentrations for Human Health Chemicals of Potential Concern for Surface Water at Site 16

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Milton, Florida

Analyte	Frequency of Detection[1]	Maximum Detected Concentration	95% UCL[2]	Exposure Point Concentration[3]
Inorganic Analytes ($\mu g/\ell$)				
Beryllium	1/1	0.21	NC	0.21

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] 95% UCL of the arithmetic mean is calculated using all samples. One-half the contract-required quantitation limit/contract-required detection limit is used as a surrogate for nondetects. The UCL is not calculated when there are less than 10 total samples.
[3] Exposure point concentration is the lower of either the 95% UCL concentration or maximum detected concentration.

Notes: % = percent.
UCL = upper confidence limit (see footnote 2).
$\mu g/\ell$ = micrograms per liter.
NC = not calculated.

Table 6-9
Exposure Point Concentrations for Human Health Chemicals of Potential Concern for Unfiltered Groundwater at Site 16

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Analyte	Frequency of Detection[1]	Maximum Detected Concentration	Arthimetic Mean[2]	Exposure Point Concentration[3]
Volatile Organic Compounds ($\mu g/\ell$)				
1,2-Dichloroethane	6/17	32	9.9	9.9
1,2-Dichloroethene (total)	6/17	50	9.1	9.1
Benzene	7/17	820	180	180
Chloroform	3/17	1	6.4	1
Trichloroethene	5/17	7	5.5	5.5
Semivolatile Organic Compounds ($\mu g/\ell$)				
bis(2-Ethylhexyl)phthalate	7/17	53	6.9	6.9
Pesticides and PCBs ($\mu g/\ell$)				
4,4'-DDT	2/17	0.15	0.06	0.06
Inorganic Analytes ($\mu g/\ell$)				
Aluminum	10/17	3,930	491	491
Arsenic	4/17	3.6	3.3	3.3
Barium	17/17	456	53.9	53.9
Cadmium	2/17	12.5	2.6	2.6
Iron	14/17	68,600	4,570	4,570
Manganese	17/17	1,370	188	188

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] Arithmetic mean of all samples calculated using one-half the contract-required quantitation limit/contract-required detection limit for nondetects.
[3] Exposure point concentration is the lower of either the arithmetic mean concentration or maximum detected concentration.

Notes: $\mu g/\ell$ = micrograms per liter.
PCB = polychlorinated biphenyl.
DDT = dichlorodiphenyltrichloroethane.

nants detected at the site are hypothetical hazards, and (2) summarize their potential toxicity in brief nontechnical language.

- A dose-response assessment is conducted to characterize and quantify the relationship between intake, or dose, of a HHCPC and the likelihood of a toxic effect or response. There are categories of toxic effects evaluated in this HHRA: carcinogenic and noncarcinogenic. Following USEPA guidance for HHRAs (USEPA, 1989a), these two endpoints (cancer and noncancer) are evaluated separately. As a result of the dose-response assessment, identified dose-response values are used to estimate the incidence of adverse effects as a function of human exposure to a chemical.

Appendix G to this report contains brief toxicity summaries for HHCPCs identified in surface soil, subsurface soil, surface water, and groundwater at Site 16. Appendix G to this report also contains dose-response information for the HHCPCs (Tables G-5 through G-10). Dose-response values used in this HHRA were current as of February 1998 for Integrated Risk Information System (IRIS) (USEPA, 1998) and October 1997 for Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997d).

6.5 RISK CHARACTERIZATION. Risk characterization is the final step in the risk assessment process. This step involves the integration of the exposure and toxicity assessments into a qualitative or quantitative expression of potential human health risks associated with contaminant exposure. Quantitative estimates of both carcinogenic and noncarcinogenic risks are made for each HHCPC and each complete exposure pathway identified in the exposure assessment. The risk characterization methodology is described in Subsection 2.5.5 of the GIR (HLA, 1998).

Risk estimates for hypothetical exposures to surface soil, subsurface soil, surface water, and groundwater under current and hypothetical future land-use scenarios are discussed below in Subsections 6.5.1 through 6.5.4. These risk estimates are then compared to USEPA and FDEP carcinogenic and noncarcinogenic target levels.

The USEPA guidelines, established in the National Oil and Hazardous Substances Contingency Plan (NCP), indicate that the total lifetime cancer risk due to exposure to the HHCPCs at a site, by each complete exposure pathway, should not exceed a range of 1 in 1,000,000 (1×10^{-6}) to 1 in 10,000 (1×10^{-4}) (USEPA, 1990). FDEP has indicated that chemical-specific risks greater than one in one million (1×10^{-6}) warrant further consideration.

A hazard quotient (HQ) less than 1 indicates that noncarcinogenic toxic effects are not expected to occur due to HHCPC exposure. Hazard indices (HIs) greater than 1 may be indicative of a possible noncarcinogenic toxic effects, but the circumstances must be evaluated on a case-by-case basis (USEPA, 1989a). As the HI increases, so does the likelihood that adverse effects might be associated with exposure. Both USEPA and FDEP consider that chemicals with HIs greater than 1 warrant further evaluation and require an evaluation of the noncarcinogenic effects.

Table 6-10 summarizes the cancer and noncancer risk under a current land-use scenario for Site 16. Table 6-11 summarizes the cancer and noncancer risk under a hypothetical future land-use scenario for Site 16.

<u>6.5.1 Surface Soil</u> The risk calculations for surface soil exposure are shown in Tables G-11 through G-24 in Appendix G to this report. For the current land-use scenario, the cancer risks associated with exposure to surface soil (ingestion, dermal contact, and fugitive dust inhalation) are 2×10^{-6} for an aggregate (combined adult and adolescent) trespasser, and 4×10^{-7} for a site maintenance worker. Both receptor's cancer risk values are at or below the USEPA acceptable cancer risk range of 1 in 10,000 to 1 in 1,000,000, although the hypothetical trespasser exceeds the FDEP target level of concern (1×10^{-6}). The noncancer risks associated with surface soil ingestion, dermal contact, and fugitive dust inhalation under hypothetical current land use (adolescent trespasser, adult trespasser, and site worker) are below USEPA's target HI of 1. Figures 6-2 and 6-3 present summaries of cancer risks and HIs, respectively, associated with exposure scenarios under current land use.

The cancer risks associated with exposure to surface soil ingestion, dermal contact, and fugitive dust inhalation under hypothetical future land use are 2×10^{-5} for an aggregate resident (combined adult and child), 2×10^{-6} for an aggregate trespasser (combined adult and adolescent), 3×10^{-6} for an occupational worker, 4×10^{-7} for a site maintenance worker, and 1×10^{-7} for an excavation worker under hypothetical future land use. All of these hypothetical future receptor risks are within or below the USEPA acceptable cancer risk range; however, the hypothetical future residential, trespasser, and occupational worker receptor risk exceeds the Florida level of concern of 1×10^{-6} (due to carcinogenic PAHs and arsenic). Figure 6-4 presents a summary of cancer risk associated with exposure scenarios under future land use.

The noncancer risks associated with surface soil ingestion, dermal contact, and fugitive dust inhalation under future land use for all hypothetical future receptors are at or below USEPA's and FDEP's target HI of 1. Figure 6-5 presents a summary of HIs associated with exposure scenarios under future land use.

<u>6.5.2 Subsurface Soil</u> The risk calculations for subsurface soil exposure are shown in Tables G-25 through G-26 in Appendix G to this report. The cancer risks associated with exposure to subsurface soil ingestion, dermal contact, and fugitive dust inhalation under hypothetical future land use is 2×10^{-7} for an excavation worker under hypothetical future land use. Figure 6-6 presents a summary of cancer risk associated with exposure scenarios under future land use. Hypothetical future receptor risk is below the USEPA and FDEP acceptable cancer risk levels.

The noncancer risks associated with subsurface soil ingestion, dermal contact, and fugitive dust inhalation under future land use for a hypothetical excavation worker are below USEPA's and FDEP's target HI of 1. Figure 6-7 presents a summary of HIs associated with exposure scenarios under future land use.

<u>6.5.3 Site 16 Surface Water</u> The risk calculations for surface water exposure are shown in Tables G-31 and G-34 in Appendix G to this report. Risk was evaluated for the current and future land-use scenario. The cancer risks associated with exposure to surface water (ingestion and dermal contact) are 1×10^{-6} for an aggregate (combined adult and adolescent) trespasser. Receptors

Table 6-10
Risk Summary, Current Land Use at Site 16

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Land Use		Exposure Route	HI*	ELCR*
Current Land Use				
Surface Soil				
	Adult Trespasser:	Incidental ingestion	0.01	6×10^{-7}
		Dermal contact	0.03	3×10^{-7}
		Inhalation of particulates	0.0001	8×10^{-10}
		Total Adult Trespasser:	0.04	9×10^{-7}
	Adolescent Trespasser:	Incidental ingestion	0.02	4×10^{-7}
		Dermal contact	0.03	1×10^{-7}
		Inhalation of particulates	0.0001	5×10^{-10}
		Total Adolescent Trespasser:	0.05	6×10^{-7}
		Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Soil:	NC	2×10^{-6}
	Site Maintenance Worker:	Incidental ingestion	0.005	2×10^{-7}
		Dermal contact	0.02	2×10^{-7}
		Inhalation of particulates	0.0004	4×10^{-9}
		Total Site Maintenance Worker:	0.02	4×10^{-7}
Surface Water				
	Adult Trespasser:	Incidental ingestion	0.000002	1×10^{-8}
		Direct contact	0.0001	7×10^{-7}
		Total Adult Trespasser	0.0001	7×10^{-7}
	Adolescent Trespasser:	Incidental ingestion	0.000003	9×10^{-9}
		Direct contact	0.0001	4×10^{-7}
		Total Adolescent Trespasser:	0.0001	4×10^{-7}
		Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Water:	NC	1×10^{-6}
		Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Soil and Surface Water:	NC	3×10^{-6}

Notes: HI = hazard index.
* = receptor totals may vary from spreadsheets due to rounding algorithm.
ELCR = excess lifetime cancer risk.
NC = not calculated because child and adult HIs are not additive.

Table 6-11
Risk Summary, Future Land Use at Site 16

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Land Use	Exposure Route	HI*	ELCR*
Future Land Use			
Surface Soil			
Adult Trespasser:	Incidental ingestion	0.01	6×10^{-7}
	Dermal contact	0.03	3×10^{-7}
	Inhalation of particulates	0.0001	8×10^{-10}
	Total Adult Trespasser:	0.04	9×10^{-7}
Adolescent Trespasser:	Incidental ingestion	0.02	4×10^{-7}
	Dermal contact	0.03	1×10^{-7}
	Inhalation of particulates	0.0001	5×10^{-10}
	Total Adolescent Trespasser:	0.05	6×10^{-7}
	Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Soil:	NC	2×10^{-6}
Adult Resident:	Incidental ingestion	0.1	5×10^{-6}
	Dermal contact	0.2	2×10^{-6}
	Inhalation of particulates	0.003	3×10^{-9}
	Total Adult Resident:	0.3	7×10^{-6}
Child Resident:	Incidental ingestion	1	1×10^{-5}
	Dermal contact	0.3	8×10^{-7}
	Inhalation of particulates	0.02	4×10^{-8}
	Total Child Resident:	1	1×10^{-5}
	Total Risk to Resident (Adult and Child) Exposed to Surface Soil:	NC	2×10^{-5}
Occupational Worker:	Incidental ingestion	0.04	2×10^{-6}
	Dermal contact	0.06	6×10^{-7}
	Inhalation of particulates	0.001	1×10^{-8}
	Total Occupational Worker:	0.1	3×10^{-6}
Site Maintenance Worker:	Incidental ingestion	0.005	2×10^{-7}
	Dermal contact	0.02	2×10^{-7}
	Inhalation of particulates	0.0004	4×10^{-9}
	Total Site Maintenance Worker:	0.02	4×10^{-7}
Excavation Worker:	Incidental ingestion	0.04	9×10^{-8}
	Dermal contact	0.02	7×10^{-9}
	Inhalation of particulates	0.0004	2×10^{-10}
	Total Excavation Worker:	0.06	1×10^{-7}
Subsurface Soil			
Excavation Worker:	Incidental ingestion		0.2
	Dermal contact		0.08
	Inhalation of particulates		ND
	Total Excavation Worker:		0.3

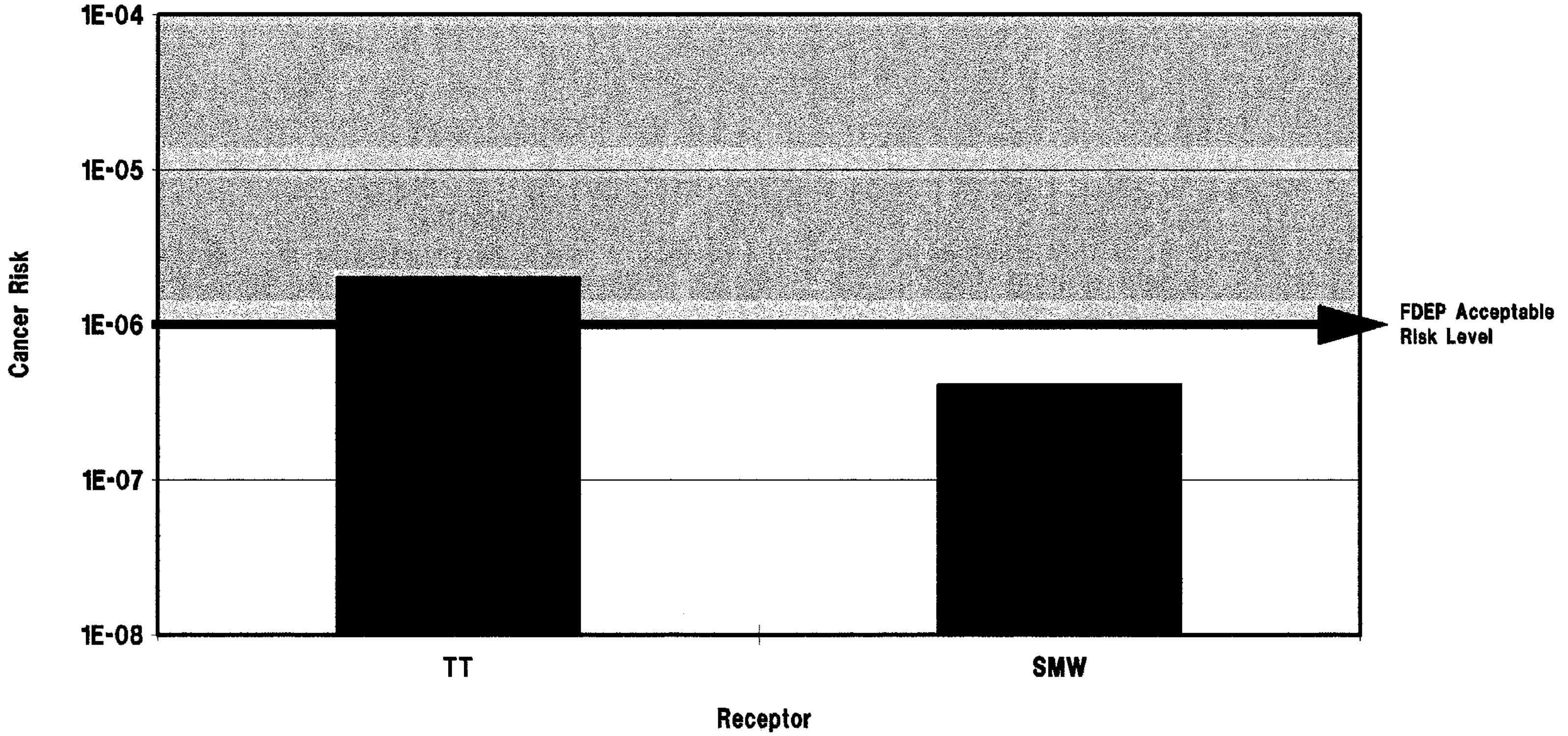
See notes at end of table.

Table 6-11 (Continued)
Risk Summary, Future Land Use at Site 16

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Land Use		Exposure Route	HI*	ELCR*
Future Land Use				
Surface Water				
	Adult Trespasser:	Incidental ingestion	0.000002	1×10^{-8}
		Direct contact	0.0001	7×10^{-7}
		Total Adult Trespasser	0.0001	7×10^{-7}
	Adolescent Trespasser:	Incidental ingestion	0.000003	9×10^{-9}
		Direct contact	0.0001	4×10^{-7}
		Total Adolescent Trespasser:	0.0001	4×10^{-7}
		Total Risk to Trespasser (Adult and Adolescent) to Surface Water:	NC	1×10^{-6}
		Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Soil and Surface Water:	NC	3×10^{-6}
	Adult Resident:	Incidental ingestion	0.000002	1×10^{-8}
		Direct contact	0.0001	8×10^{-7}
		Total Adult Resident:	0.0001	8×10^{-7}
	Child Resident:	Incidental ingestion	0.0001	2×10^{-7}
		Direct contact	0.0004	7×10^{-7}
		Total Child Resident:	0.0005	9×10^{-7}
		Total Risk to Resident (Adult and Child) Exposed to Surface Water:	NC	2×10^{-6}
		Total Risk to Resident (Adult and Child) Exposed to Surface Water, Groundwater and Surface Soil:	NC	1×10^{-4}
Groundwater				
	Adult Resident:	Ingestion of groundwater as drinking water	18	5×10^{-5}
		Inhalation of volatiles while showering	ND	2×10^{-5}
		Total Adult Resident:	18	7×10^{-5}
	Child Resident:	Ingestion of groundwater as drinking water	41	6×10^{-5}
		Total Child Resident:	41	6×10^{-5}
		Total Risk to Resident (Adult and Child) Exposed to Groundwater:	NC	1×10^{-4}

Notes: HI = hazard index.
* = receptor totals may vary from spreadsheets due to rounding algorithm.
ELCR = excess lifetime cancer risk.
NC = not calculated because child and adult HIs are not additive.
ND = no dose-response data for this exposure route were available for human health chemical of potential concerns in this medium.



LEGEND

(shaded)	USEPA acceptable risk range
USEPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
TT	Total trespasser
SMW	Site maintenance worker

FIGURE 6-2
**CANCER RISK SUMMARY
CURRENT LAND USE FOR SURFACE
SOIL AT SITE 16**

**REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND
BURNING AREA**

**NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA**

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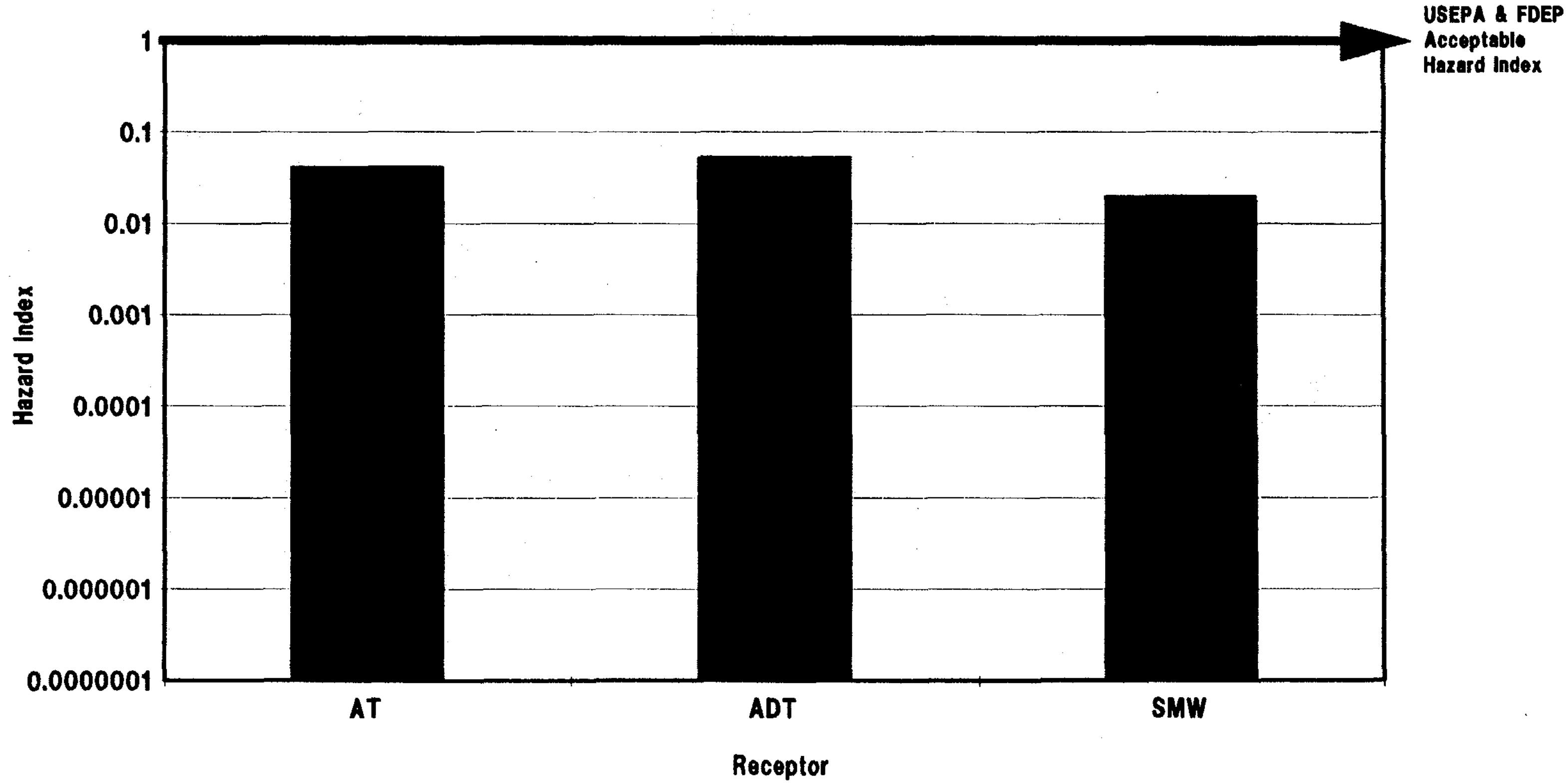

LEGEND

USEPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
AT	Adult trespasser
ADT	Adolescent trespasser
SMW	Site maintenance worker

FIGURE 6-3
NONCANCER RISK SUMMARY
CURRENT LAND USE FOR SURFACE
SOIL AT SITE 16

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND
BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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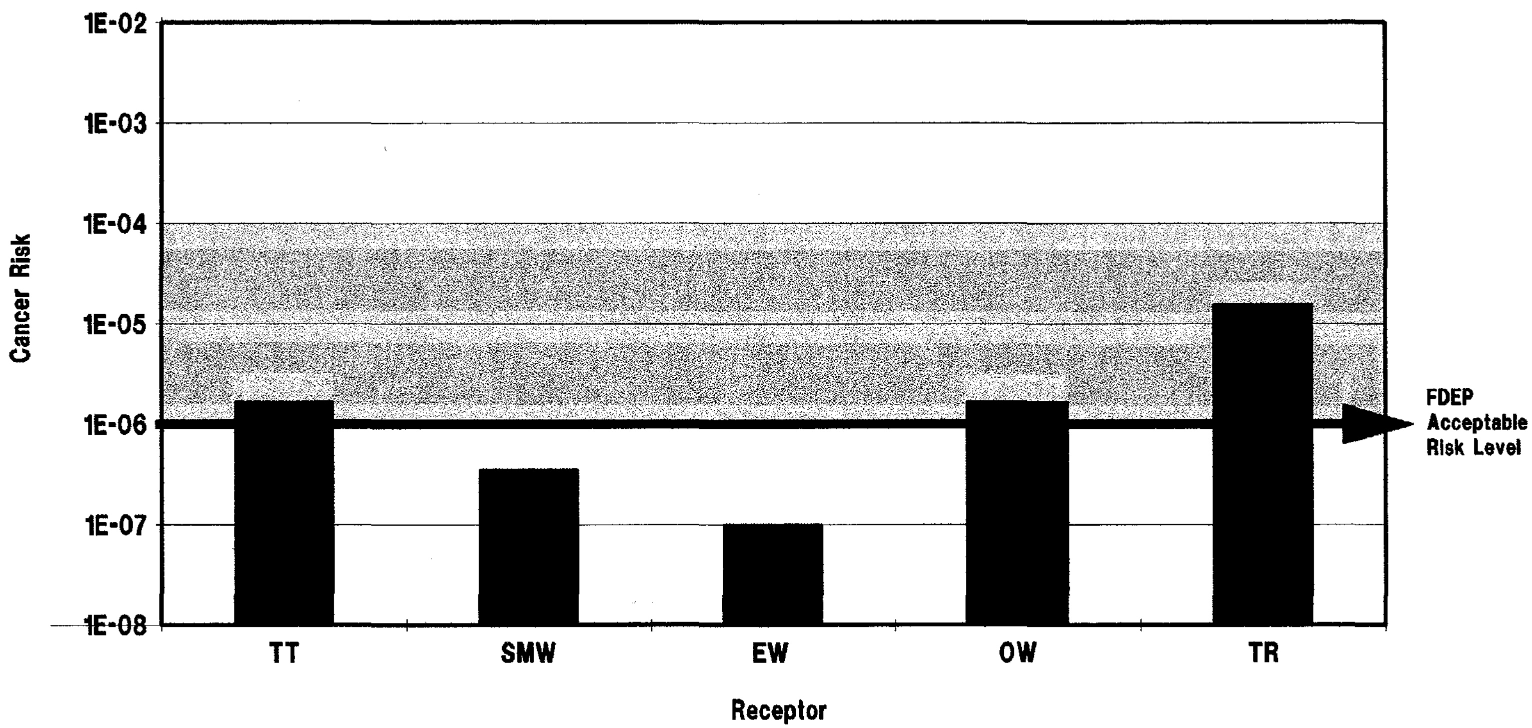

LEGEND

(shaded)	USEPA acceptable risk range
USEPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
TT	Total trespasser
SMW	Site maintenance worker
EW	Excavation worker
OW	Occupational worker
TR	Total resident

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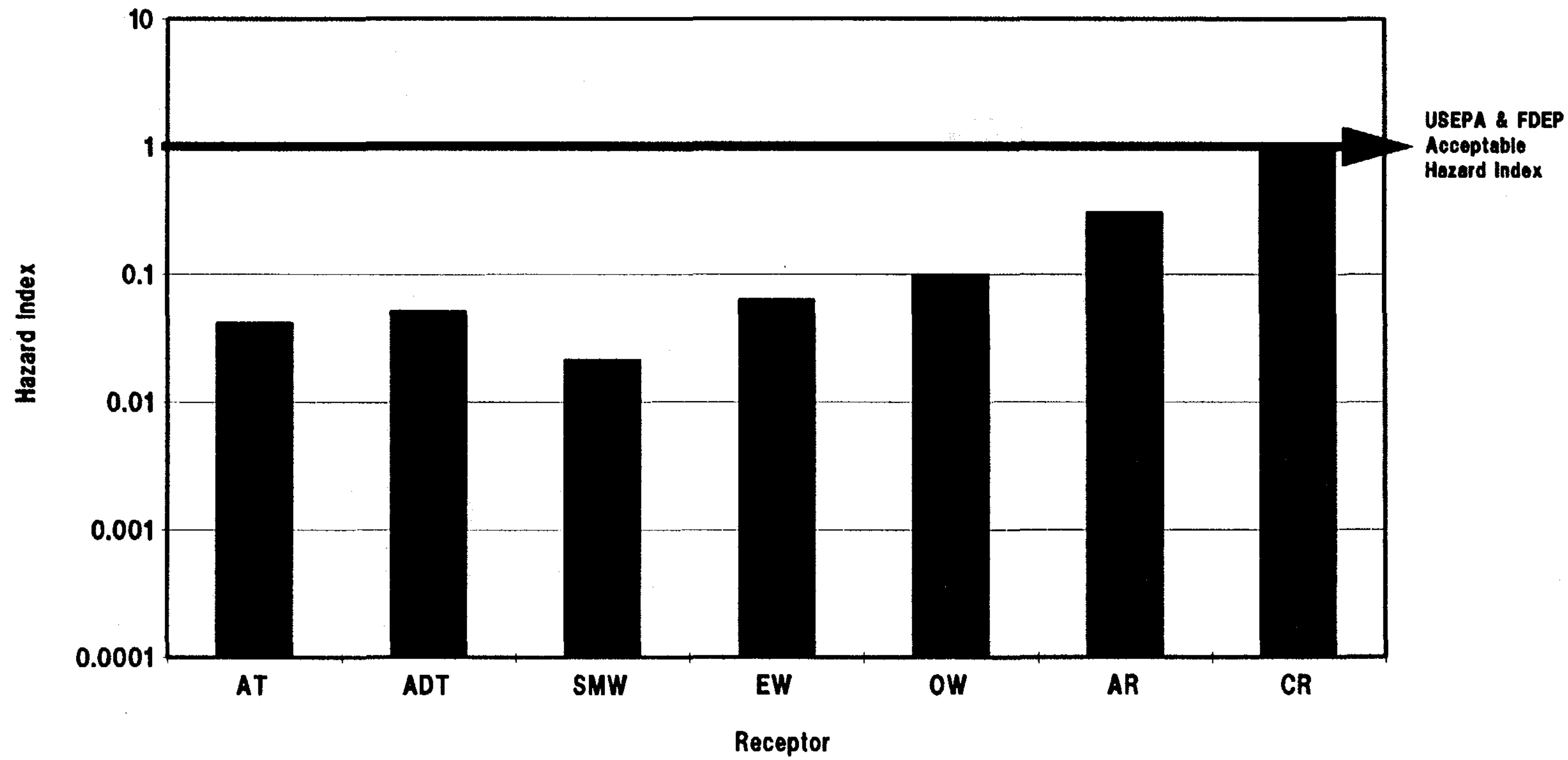
FIGURE 6-4
CANCER RISK SUMMARY
FUTURE LAND USE FOR SURFACE SOIL AT SITE 16

SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA



LEGEND

USEPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
AT	Adult trespasser
ADT	Adolescent trespasser
SMW	Site maintenance worker
EW	Excavation worker
OW	Occupational worker
AR	Adult resident
CR	Child resident

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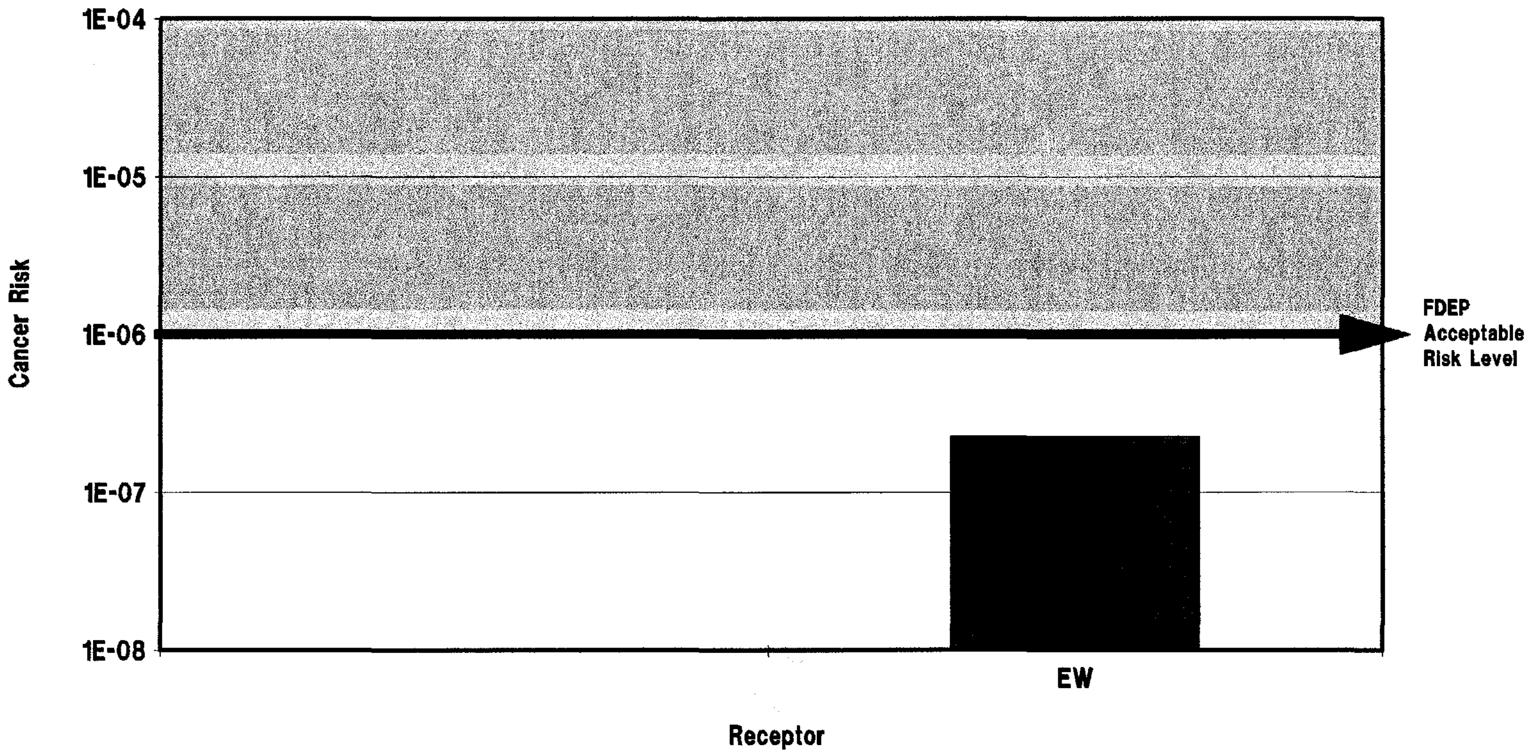
FIGURE 6-5
NONCANCER RISK SUMMARY
FUTURE LAND USE FOR SURFACE
SOIL AT SITE 16

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND
BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA



LEGEND

	USEPA acceptable risk range
USEPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
EW	Excavation worker

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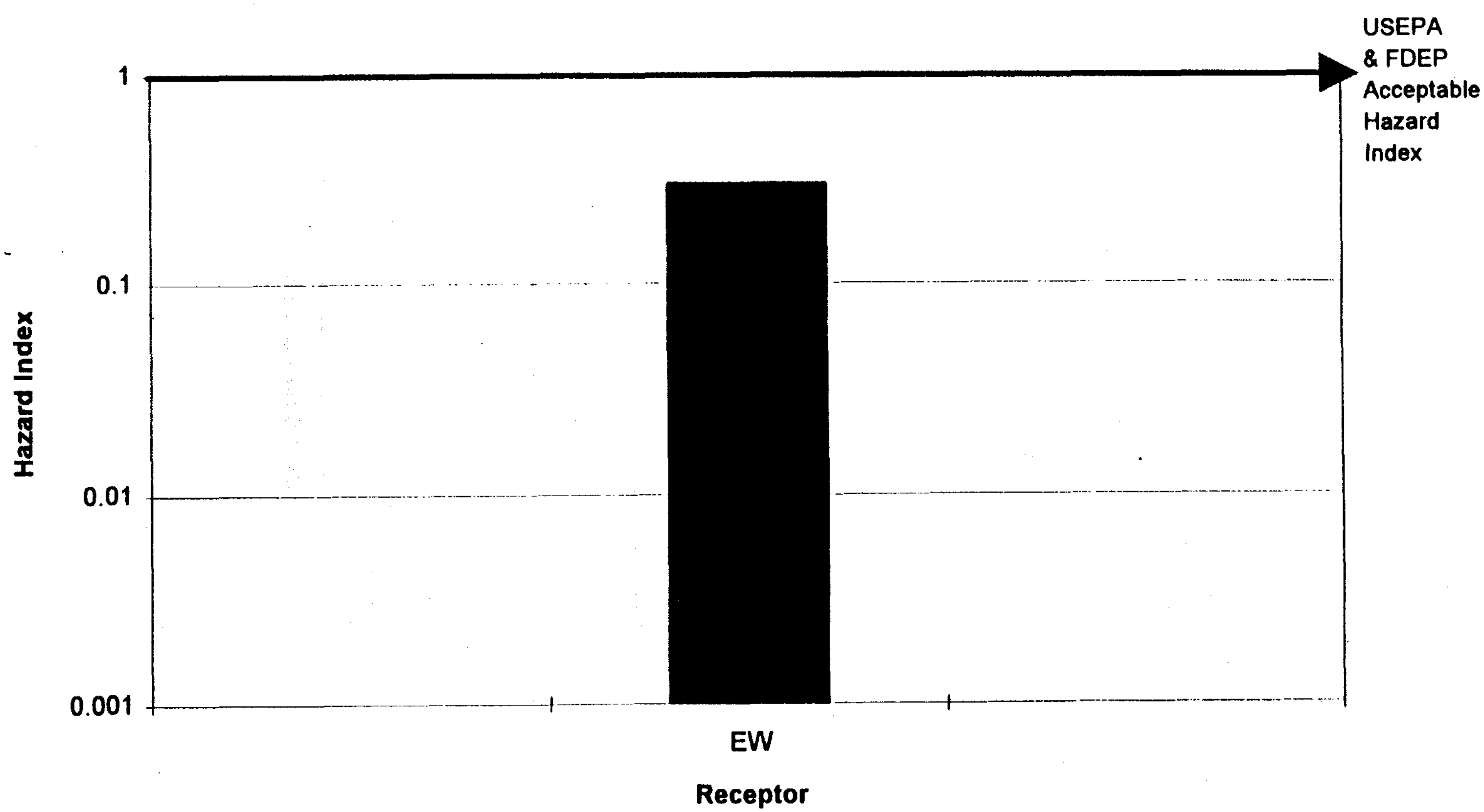
FIGURE 6-6
CANCER RISK SUMMARY
CURRENT LAND USE FOR SUBSURFACE SOIL AT SITE 16

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA



NOTES:

USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection
EW = Excavation worker

FIGURE 6-7
NONCANCER RISK SUMMARY
CURRENT LAND USE FOR SUBSURFACE SOIL AT SITE 16

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

H:\HEIDI\WHITING\SITE16\FIG6-7 PM5 SUB16.XLS 082898HAS cancer risk values are less than the USEPA acceptable cancer risk range of 1×10^{-4} to 1×10^{-6} and at FDEP's target risk of 1×10^{-6}. The noncancer risks associated with surface water ingestion and dermal contact under a hypothetical current land use (adolescent trespasser and adult trespasser) are below USEPA's and FDEP's target HI of 1. Figures 6-8 and 6-9 present summaries of the carcinogenic and noncarcinogenic risks from surface water to hypothetical current receptors.

The cancer risks associated with exposure to surface water ingestion and dermal contact under hypothetical future land use are 1×10^{-6} for an aggregate trespasser (combined adult and child) and 2×10^{-6} resident (combined adult and child). All of these hypothetical future receptors risk are below or at the USEPA acceptable cancer risk range but the future resident exceeds the Florida target carcinogenic level of concern of 1×10^{-6}. Figure 6-10 presents a summary of cancer risk associated with exposure scenarios under future land use.

Under hypothetical future land use, the noncancer risks associated with surface water ingestion for all hypothetical future receptors do not exceed the FDEP's and USEPA's target HI of 1. Figure 6-11 presents a summary of the noncancer risk from surface water to potential future receptors.

6.5.4 Site 16 Groundwater The risk calculations for groundwater exposure are shown in Tables G-27 and G-30 in Appendix G to this report. Currently, there are no potable supply wells at the site; therefore, there is no human exposure to groundwater. Therefore, risk was not evaluated for the current land-use scenario.

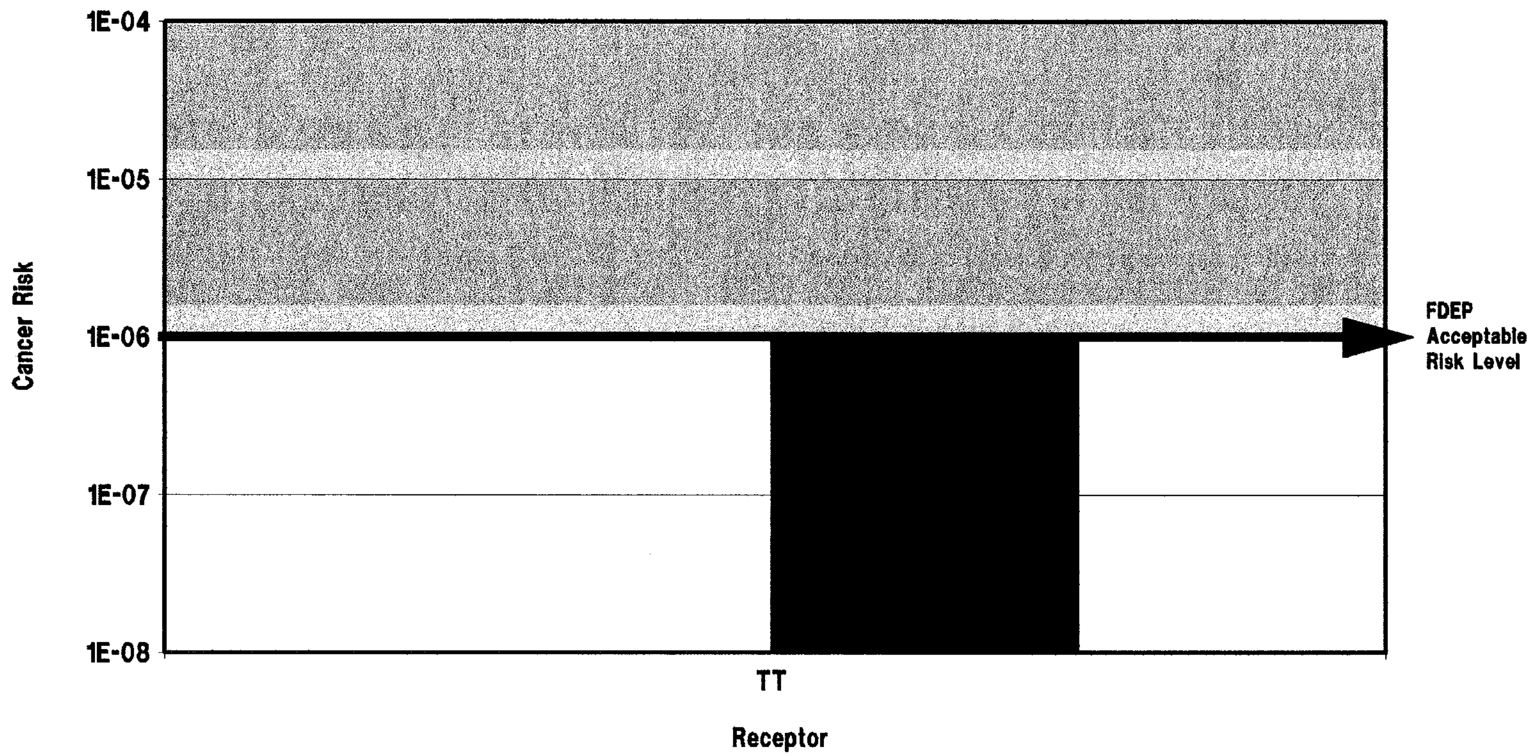
The cancer risks associated with exposure to groundwater ingestion under hypothetical future land use are 1×10^{-4} for an aggregate resident (combined adult and child). The hypothetical future residential receptor risk is within the USEPA acceptable cancer risk range; however, it exceeds the Florida level of concern of 1×10^{-6} (mainly due to 1,2-dichloroethane and arsenic). Figure 6-12 presents a summary of cancer risk associated with exposure scenarios under this hypothetical future land use.

Under a hypothetical future land use, the noncancer risks associated with groundwater ingestion for the adult and child resident exceed the USEPA's and FDEP's target HI of 1. Figure 6-13 presents a summary of noncancer risk associated with exposure scenarios under a hypothetical future residential land use.

6.5.5 Cumulative Risk Summary. Site 16 Cumulative USEPA Region IV guidance requires an assessment of a cumulative receptor risk.

In this HHRA, the hypothetical future residential receptor could potentially be exposed to surface soils, groundwater, and surface water. The cumulative risk of 1×10^{-4} is within the USEPA acceptable cancer risk range; however, it exceeds the FDEP target level of concern. This risk is primarily due to groundwater.

The current and hypothetical trespasser receptor could potentially be exposed to both surface soil and surface water. The cumulative risk of 3×10^{-6} is within the USEPA acceptable risk range but exceeds FDEP target level of concern.



LEGEND

(shaded)	USEPA acceptable risk range
USEPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
TT	Total trespasser

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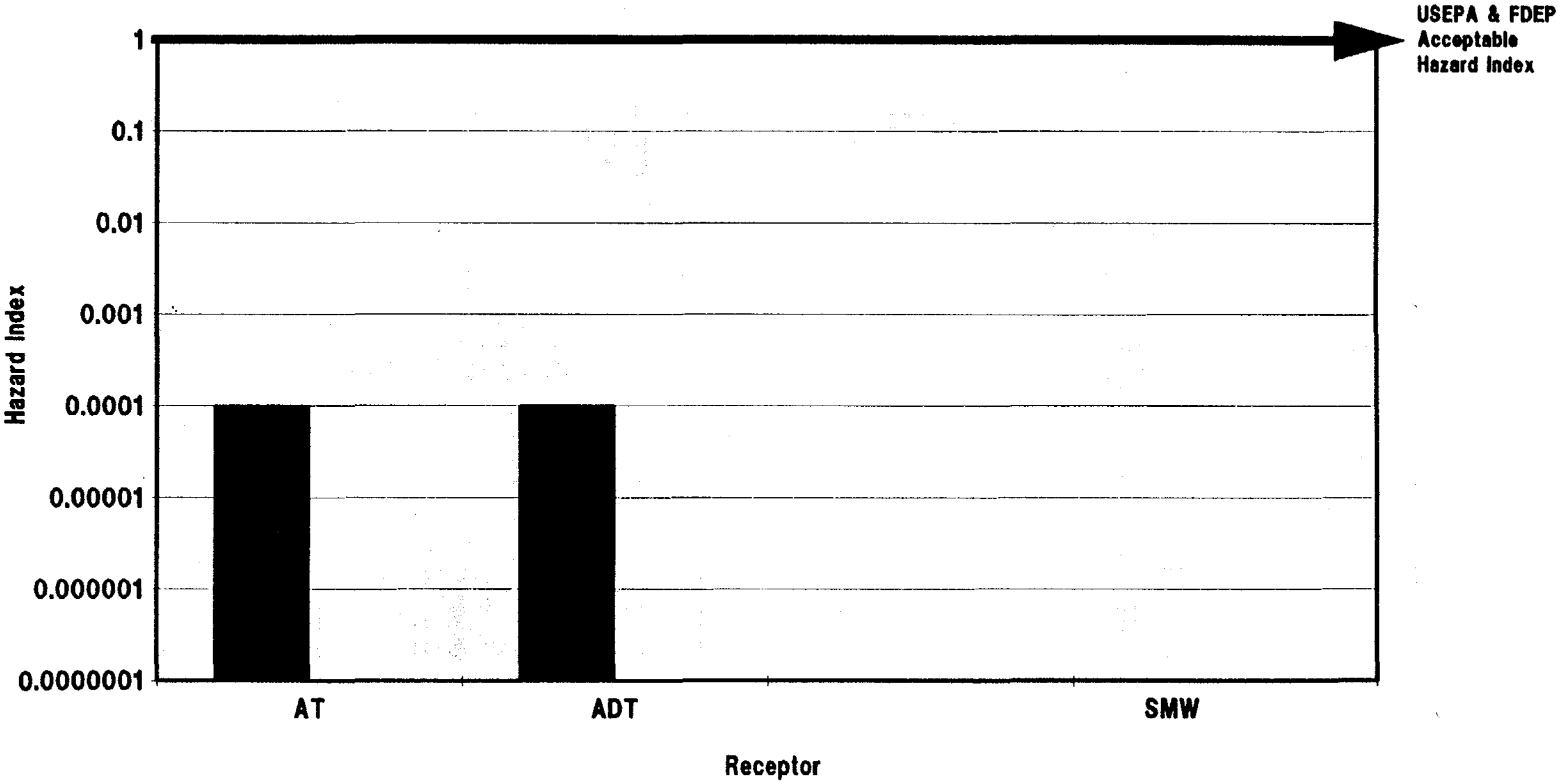
FIGURE 6-8
CANCER RISK SUMMARY
CURRENT LAND USE FOR SURFACE WATER
AT SITE 16

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND
BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA



LEGEND

USEPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
AT	Adult trespasser
ADT	Adolescent trespasser

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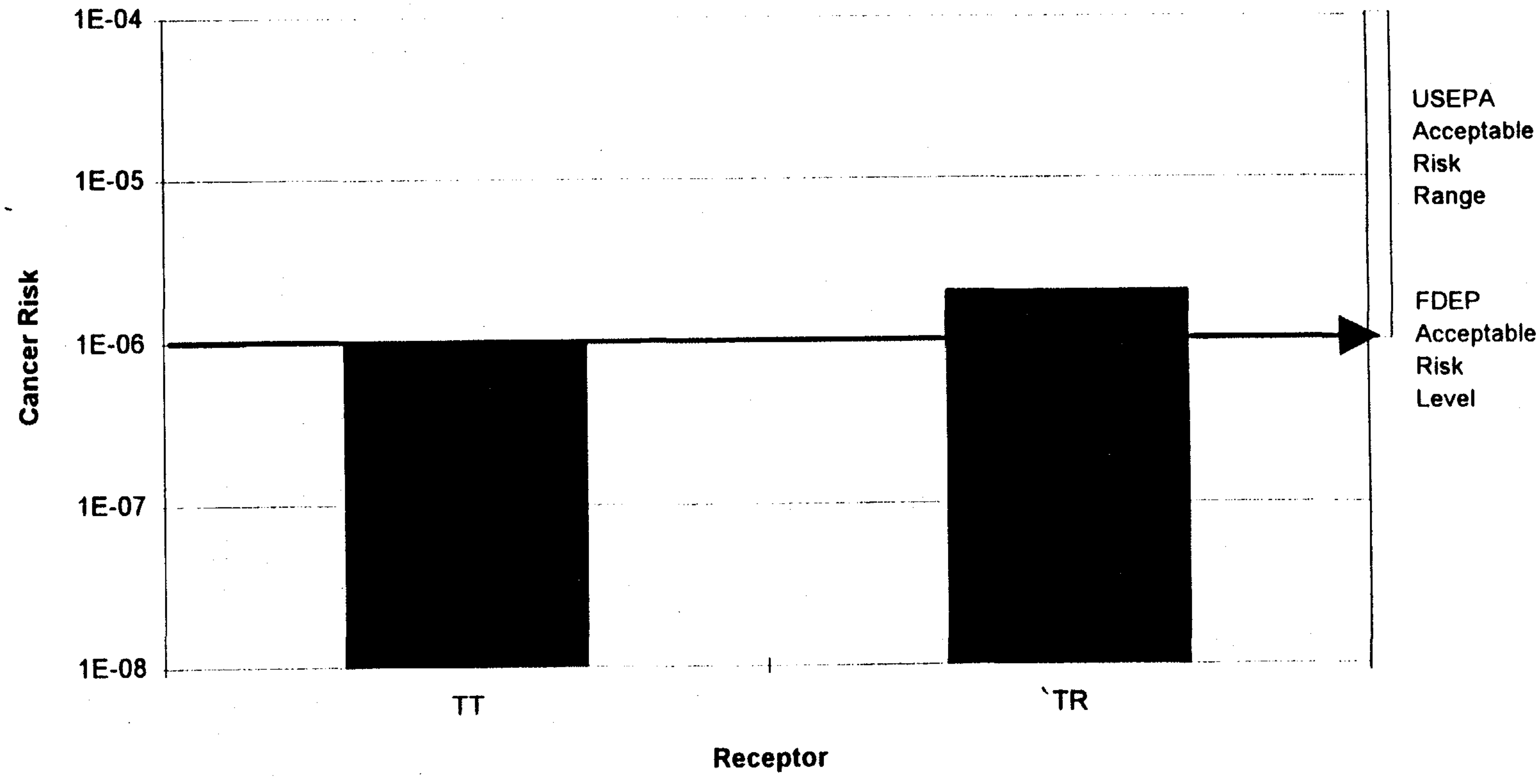
FIGURE 6-9
NONCANCER RISK SUMMARY
CURRENT LAND USE FOR SURFACE WATER
AT SITE 16

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND
BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA



NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection
TT = Total trespasser
TR = Total resident

FIGURE 6-10
CANCER RISK SUMMARY
FUTURE LAND USE FOR SURFACE WATER
AT SITE 16

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND
BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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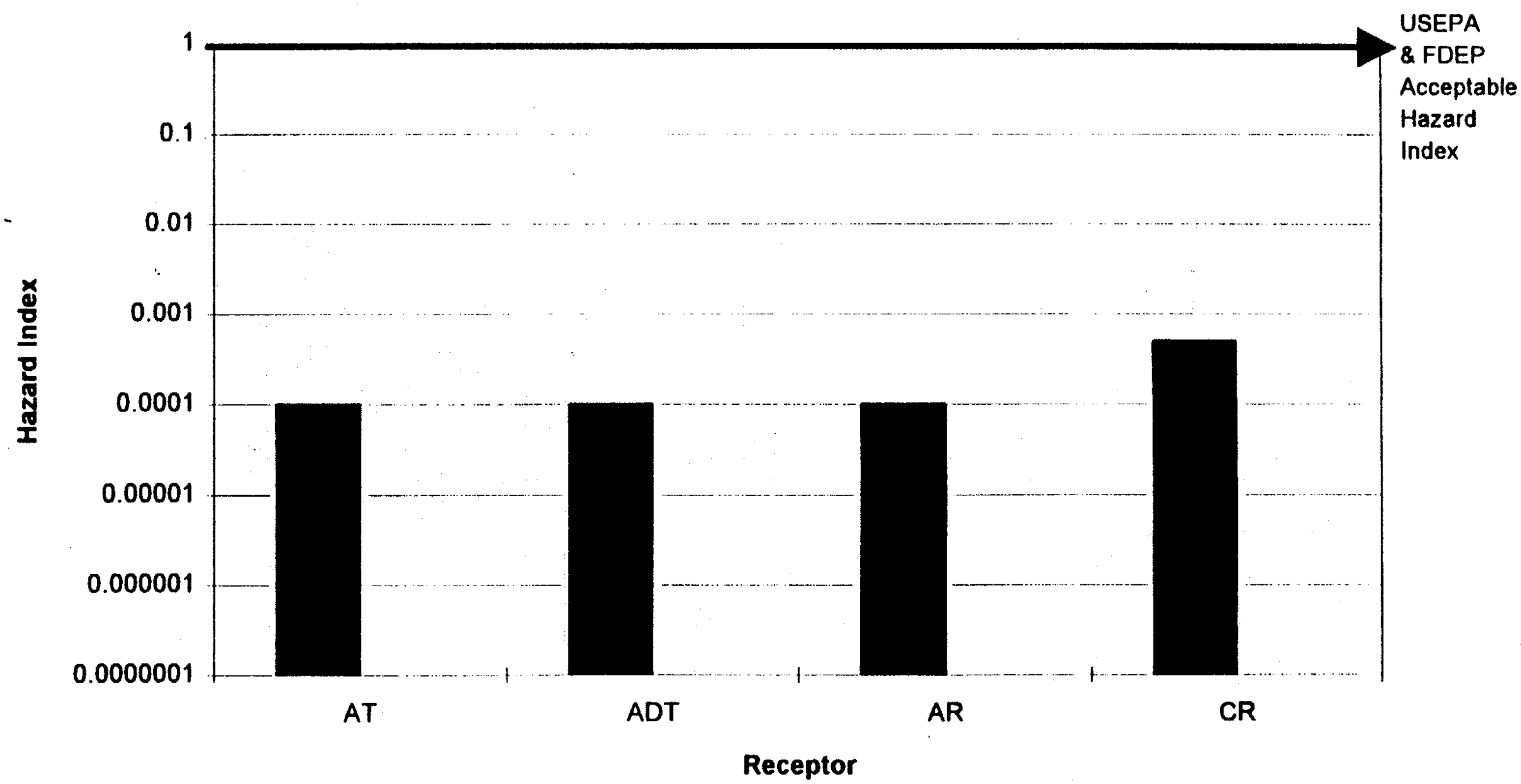

NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection
AT = Adult trespasser
ADT = Adolescent trespasser
AR = Adult resident
CR = Child resident

FIGURE 6-11
NONCANCER RISK SUMMARY
FUTURE LAND USE FOR SURFACE WATER
AT SITE 16

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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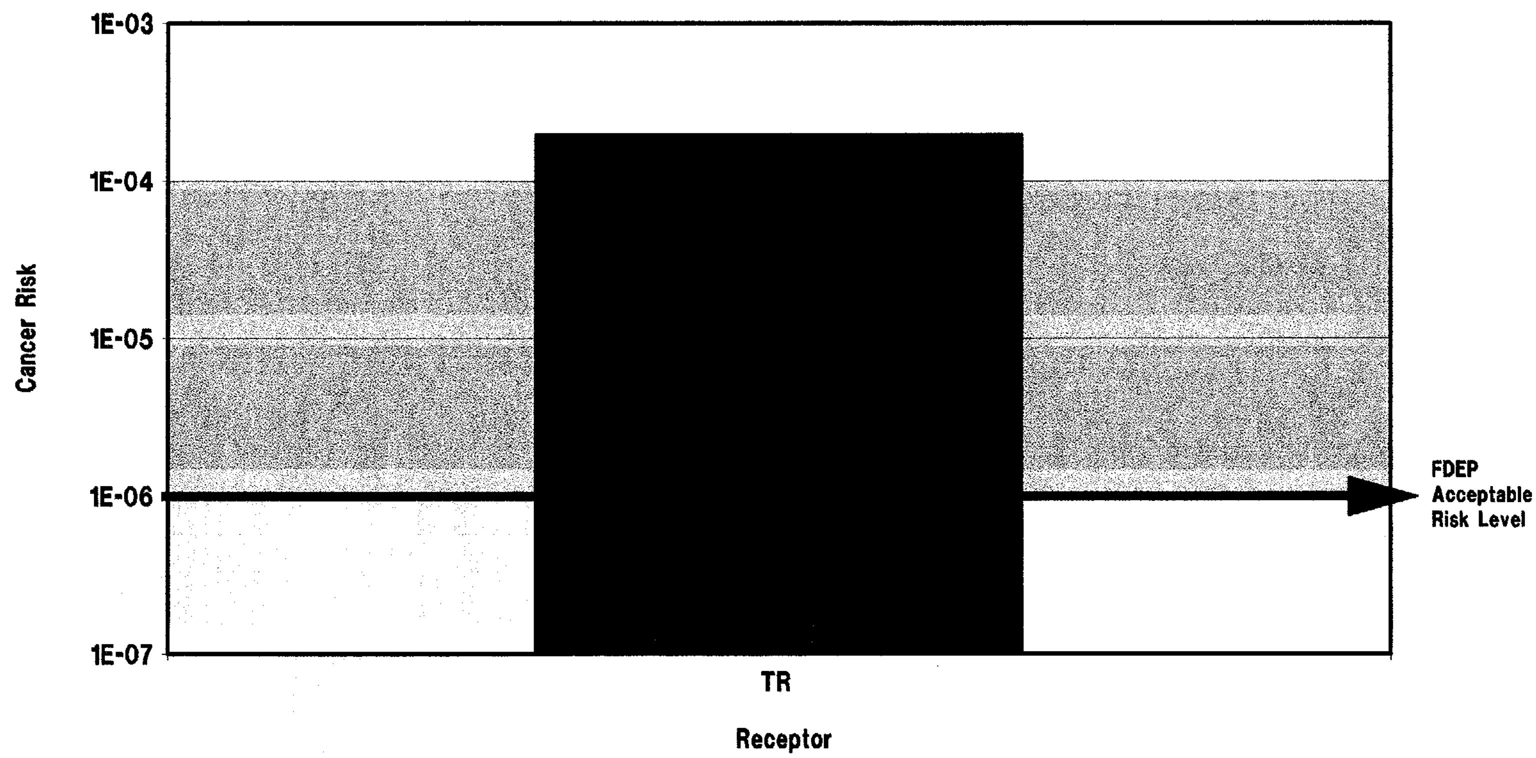

LEGEND

USEPA acceptable risk range

USEPA U.S. Environmental Protection Agency
FDEP Florida Department of Environmental Protection
TR Total resident

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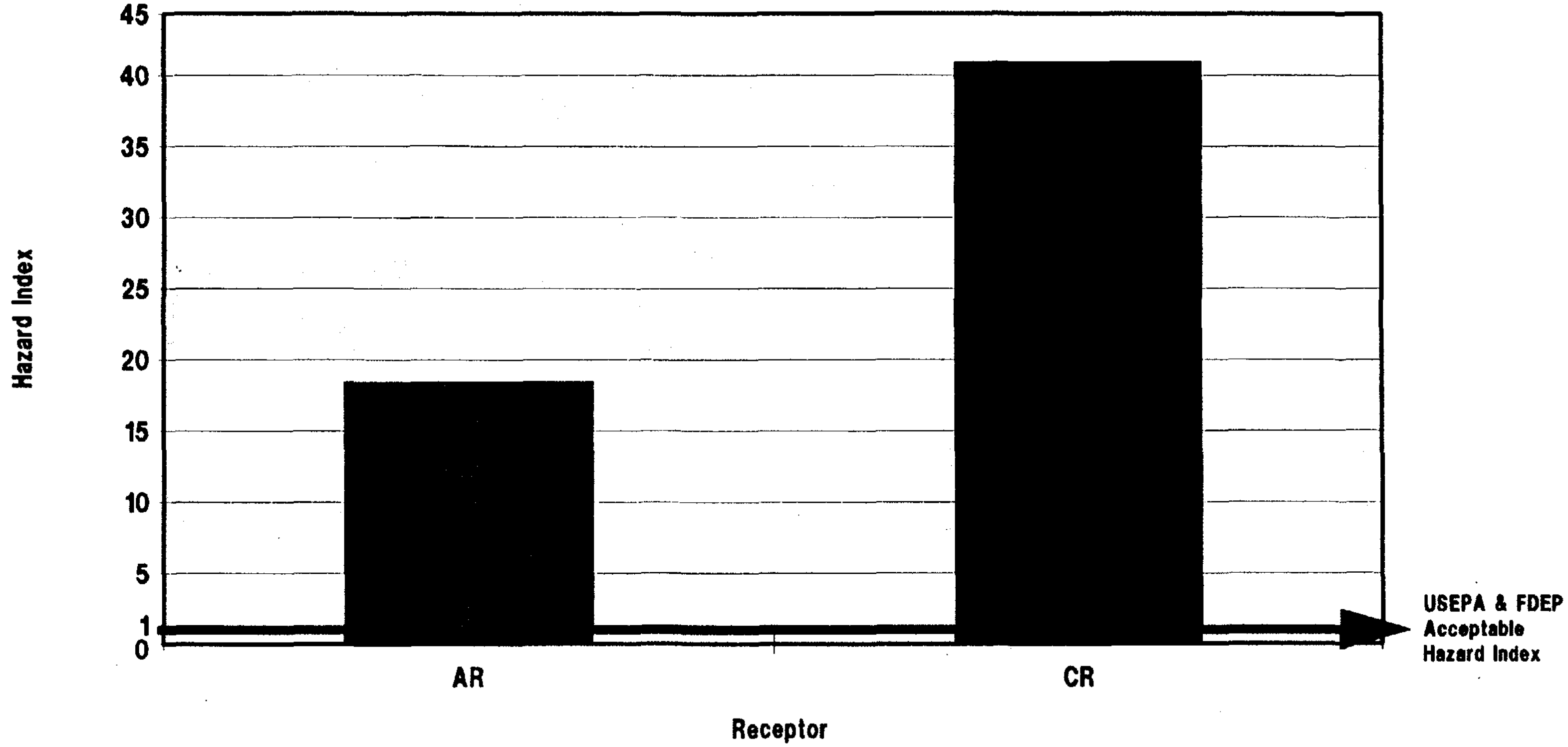
FIGURE 6-12
CANCER RISK SUMMARY
FUTURE LAND USE FOR GROUNDWATER
AT SITE 16

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND
BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA



LEGEND

USEPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
AR	Adult resident
CR	Child resident

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FIGURE 6-13
NONCANCER RISK SUMMARY
FUTURE LAND USE FOR GROUNDWATER
AT SITE 16

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND
BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

6.6 UNCERTAINTY ANALYSIS. General uncertainties associated with the collection, analysis, and evaluation of data; exposure assessment; toxicity assessment; and the risk estimation process are discussed in Paragraph 2.5.5.1 of the GIR (HLA, 1998). Site-specific uncertainties that are important for the interpretation of the calculated risk estimates for surface soil, subsurface soil, groundwater, and surface water at Site 16 are discussed below.

- The surface soil carcinogenic risks at Site 16 are driven by carcinogenic PAHs and arsenic. The PAHs may be due to other anthropogenic sources and the arsenic is likely to be at naturally occurring levels or due to other sources such as pesticides application. Therefore, it is uncertain whether or not this risk to hypothetical current and future receptors is actually due to past site operations.

- The lack of inhalation RfDs for the HHCPCs in surface soil may have resulted in underestimates of the HIs associated with exposure to surface soil at Site 16; however, these noncancer risks are not likely to be significant when compared to oral risks that are fully characterized.

- The sample quantitation limits (SQLs) were compared to the risk-based screening criteria and Florida regulatory guidelines for all analytes not selected as HHCPCs to assess whether or not the detection limits were adequate to detect analytes at levels of concern (SQLs of analytes with 100 percent frequency of detection were not evaluated). The analytes with an SQL that exceeds its screening criterion are thallium in surface soil; and naphthalene and beryllium in groundwater. However, because the laboratory equipment was able to detect below the SQL for beryllium, naphthalene, and thallium, the SQLs were considered adequate for this HHRA.

- Groundwater samples at Site 16 were collected at different depth intervals (shallow, intermediate, and deep) to determine if contamination is confined/limited to one interval. The maximum contaminant concentrations were evaluated to determine if the HHRA should evaluate the groundwater intervals separately. The maximum detected concentrations of the inorganic HHCPCs (excluding arsenic) were identified from the shallow interval. Concentrations of volatile analytes were identified in the intermediate and deep intervals, which would result in HHCPC selection. Therefore, it does not appear that the risks can be isolated to one groundwater depth interval and the combined groundwater risk is characteristic of the potential risks from the semiconfined aquifer.

- Some uncertainty was associated with the representativeness of the groundwater data used to complete the risk evaluation at Site 16. Generally, because the low-flow purging and sampling method was used, turbidity in the unfiltered groundwater samples was minimal. However, the analytical results for some of the unfiltered samples may be biased high for inorganic constituents as a result of suspended solids.

- Groundwater samples at Site 16 were collected at different intervals (shallow, intermediate, and deep) to determine if contamination is concentrated at one interval. Inorganic and 4,4'-DDT HHCPCs were identified from the shallow intervals. Volatile HHCPCs were identified from the intermediate intervals. It does not appear that the risks can be isolated at one interval; therefore, the groundwater risks from each aquifer were characterized together.

- According to the methodology described in the GIR (HLA, 1998) (Paragraph 2.5.3.3), central tendency carcinogenic risk to hypothetical future receptors that have risks exceeding Florida levels of concern was evaluated. The central tendency evaluation involved using the upper confidence limit (UCL) of the mean concentration and reasonable but less conservative exposure parameters are designed to provide a probable risk level (USEPA, 1995a).

  The carcinogenic risk to hypothetical current and future trespassers, occupational workers, and future residents exceeded the FDEP target of 1×10^{-6}. The central tendency carcinogenic risk results for these receptors and the central tendency exposure parameters are presented in Table G-35 through G-44 in Appendix G of this report. Only central tendency ingestion and dermal exposures were characterized because the contribution from inhalation was insignificant compared to the total risk.

  The central tendency carcinogenic risk exposed to surface soil is 3×10^{-6} for an aggregate residential receptor, 2×10^{-7} for an aggregate trespasser, and 8×10^{-7} for an occupational worker.

  The central tendency aggregate residential risk exposed to groundwater is 3×10^{-5} for carcinogenic risk. The noncarcinogenic risk remains in excess of the USEPA and FDEP target HI of 1.

  The central tendency aggregate residential risk to surface water is 1×10^{-6}.

  The risk range presented by the reasonable maximum exposure (RME) and central tendency exposure scenarios for hypothetical current and future receptors are useful as information to provide perspective for the risk manager and compliance with USEPA guidance (USEPA, 1995a).

6.7 **REMEDIAL GOAL OPTIONS**. Remedial goal option (RGO) tables are presented for each medium with a total excess lifetime cancer risk (ELCR) greater than 1×10^{-4} or an HI greater than 1 per USEPA guidance, and for media with chemicals whose estimated risk exceeds Florida target risk level. The RGO concentrations are calculated using the scenario representing the highest estimated risk for a given medium. Based on the above criteria, RGOs are developed for each chemical with a total ELCR greater than 1×10^{-6} or an HQ greater than 0.1. Analytes whose EPCs exceed Florida standards are also presented in the RGO tables.

RGOs and available Federal regulatory and FDEP risk-based criteria are intended to provide the basis for the development of remedial alternatives in the FS. The RGO values are not actual or proposed cleanup levels, but are provided to assist risk-management decision making in the FS.

Table 6-12 presents the RGOs for surface soil for Site 16. RGOs are presented for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and arsenic based on cancer risks for the adult and child resident at Site 16. Manganese is presented based on noncancer risk. Dieldrin, beryllium, and lead are presented because the maximum detected concentration exceeded the Florida SCTL for a residential scenario.

Table 6-13 presents the RGOs for subsurface soil. Arsenic and lead are presented because the maximum detected value exceeded the Florida SCTL for an industrial scenario.

Table 6-14 presents the RGOs for groundwater. RGOs for 1,2-dichloroethane, 1,2-dichloroethene (total), benzene, TCE, bis(2-ethylhexyl)phthalate, and arsenic are based on cancer risks for the adult and child resident at Site 16.

Benzene, arsenic, cadmium, iron, and manganese RGOs are based on noncancer risks to the adult resident. 4,4'-DDT, aluminum, antimony, and chloroform are presented because the maximum detected value exceeded the Florida groundwater guidance concentration. It should be noted that the EPC for arsenic is an order of magnitude less than the Federal drinking water standard and Florida groundwater guidance concentration.

Table 6-15 presents the RGO for beryllium in surface water. This RGO is based on the ECLR to hypothetical future residents.

6.8 <u>SUMMARY OF HUMAN HEALTH RISK ASSESSMENT FOR SITE 16</u>. HHCPCs were identified and risks were estimated for surface soil, subsurface soil, groundwater, and surface water associated with Site 16. The following conclusions were drawn based on this HHRA:

- The HHCPCs detected in surface soil, subsurface soil, groundwater, and surface water do not pose unacceptable carcinogenic risks to the receptors evaluated based on evaluation of the samples using USEPA guidelines and target risk range.

- The subsurface soil risk levels are below the USEPA and FDEP target levels of concern.

- The total ELCR for groundwater associated with residential ingestion and inhalation of VOCs while showering exceeded the Florida target level of concern due primarily to VOCs (primarily benzene) and arsenic. However, the groundwater at NAS Whiting Field is being addressed under a facilitywide investigation of Site 40.

- The groundwater noncancer risk exceeds both the USEPA and FDEP target HI due primarily to benzene. However, as noted above, groundwater will be addressed in a facilitywide assessment of Site 40.

- The surface water ELCR for hypothetical future residents exceeds Florida's target level of concern due to beryllium. It should be noted, however, that this ELCR is based only on one sample.

Table 6-12
Summary of Remedial Goal Options for Surface Soil at Site 16

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Range of Detected Concentrations	Exposure Point Concentration	Total Excess Lifetime Cancer Risk (Based on Risk to Resident [adult and child])			Total Hazard Index (Based on Risk to Child Resident)			Florida Soil Cleanup Target Level (Residential)[1]	Florida Soil Cleanup Target Level (Leaching)[1]	Background Screening Concentration
			10^{-4}	10^{-5}	10^{-6}	3	1	0.1			
Semivolatile Organic Compounds (µg/kg)											
Benzo(a)anthracene	56 to 2,300	351	NR	NR	NR	NA	NA	NA	1,400	3,200	NB
Benzo(a)pyrene	71 to 3,100	370	NR	NR	70	NA	NA	NA	100	8,000	NB
Benzo(b)fluoranthene	86 to 3,600	412	NR	NR	NR	NA	NA	NA	1,400	10,000	NB
Dibenz(a,h)anthracene	110 to 700	340	NR	700	70	NA	NA	NA	100	30,000	NB
Indeno(1,2,3-cd)pyrene	62 to 1,900	324	NR	NR	NR	NA	NA	NA	1,500	28,000	NB
Pesticides (µg/kg)											
Dieldrin	2.5 to 130	32	NR	NR	NR	NA	NA	NA	70	4	NA
Inorganic Analytes (mg/kg)											
Arsenic	0.7 to 12.1	166	NR	NR	23	NA	NA	NA	0.8	29	4.62
Beryllium	0.06 to 0.3	0.3	NA	NA	NA	NA	NA	NA	120	63	0.36
Lead	4.4 to 759	473	NA	NA	NA	NA	NA	NA	400	NC	10.2
Manganese	5.3 to 372	296	NA	NA	NA	NR	NR	247	1,600	NC	180

[1] Values are for residential soil, from Florida Department of Environmental Protection (FDEP) Chapter 62-777, Florida Administrative Code (FDEP, 1999).

Notes: µg/kg = micrograms per kilogram.
NR = not reported because the calculated remedial goal option exceeds the exposure point concentration.
NA = not applicable.
NB = not detected in background sample.
mg/kg = milligrams per kilogram.
NC = not calculated.

Table 6-13
Summary of Remedial Goal Options for Subsurface Soil at Site 16

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
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Analyte	Range of Detected Concentrations	Exposure Point Concentration	Total Excess Lifetime Cancer Risk (Based on Risk to Resident (adult and child)			Total Hazard Index (Based on Risk to Child Resident)			Florida Soil Cleanup Target Level (Residential)[1]	Florida Soil Cleanup Target Level (Leaching)[1]	Background Screening Concentration
			10^{-4}	10^{-5}	10^{-6}	3	1	0.1			
Inorganic Analytes (mg/kg)											
Arsenic	1.5 to 15.1	15.1	NR	NR	NR	NR	NR	NR	3.7	29	4.62
Lead	6.8 to 766	766	NA	NA	NA	NA	NA	NA	400	NC	8.4

[1] Values are for industrial soil, from Florida Department of Environmental Protection (FDEP) Soil Cleanup Target Levels, Chapter 62-777, Florida Administrative Code (FDEP, 1999).

Notes: mg/kg = milligrams per kilograms.
NR = not reported because the calculated remedial goal option exceeds the exposure point concentration.
NC = not calculated.
NA = not applicable because the risk from this analyte is below the USEPA and FDEP target levels.

Table 6-14
Summary of Remedial Goal Options for Groundwater at Site 16

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Range of Detected Concentrations	Exposure Point Concentration	Total Excess Lifetime Cancer Risk (Based on Risk to Resident (adult and child)			Total Hazard Index (Based on Risk to Child Resident)			Florida Groundwater Cleanup Target Level[1]	Federal MCL[2]	Background Screening Concentration
			10^{-4}	10^{-5}	10^{-6}	3	1	0.1			
Volatile Organic Compounds ($\mu g/\ell$)											
1,2-Dichloroethane	1 to 32	9.9	NR	16	1.6	NR	NR	NR	3	5	NB
1,2-Dichloroethene	1 to 50	9.1	NR	1.0	0.1	NR	NR	NR	70	70	NB
Benzene	1 to 820	180	180	18	1.8	116	39	3.9	1	5	NB
Chloroform	1	6.4	NR	NR	NR	NR	NR	NR	5.7	0.1	NB
Trichloroethene	2 to 7	5.5	NR	NR	5.5	NR	NR	NR	3	5	NB
Semivolatile Organic Compounds ($\mu g/\ell$)											
bis(2-Ethylhexyl)phthalate	1 to 53	6.9	NR	NR	4.8	NR	NR	NR	6	6	NA
Pesticides ($\mu g/\ell$)											
4'4'-DDT	0.14 to 0.15	0.06	NR	NR	NR	NR	NR	NR	0.1	NC	NA
Inorganic Analytes ($\mu g/\ell$)											
Aluminum	14.65 to 200	491	NA	NA	NA	NR	NR	NR	200	50 to 200	654
Antimony	8.6 to 60	21.8	NA	NA	NA	NR	NR	NR	6	6	20.4
Arsenic	0.6 to 3.6	3.3	4.5	0.45	0.05	NR	3.3	0.33	50	50	ND
Cadmium	2.2 to 12.5	2.6	NA	NA	NA	NR	NR	0.6	5	5	4.4
Iron	7.3 to 68,600	4,570	NA	NA	NA	NR	3,300	330	300	300	964
Manganese	1.3 to 1,370	188	NA	NA	NA	NR	NR	50.8	50	50	42.8

[1] Florida Department of Environmental Protection Cleanup Target Levels, Chapter 62-777, Florida Administrative Code (FDEP, 1999).
[2] Federal MCLs are taken from USEPA Drinking Water Regulations and Health Advisories from October 1996.

Notes: MCL = maximum contaminant level.
$\mu g/\ell$ = micrograms per liter.
NR = not reported because the calculated remedial goal option exceeds the exposure point concentration.
NB = not detected in background sample.
NA = not applicable because there is no carcinogenic or noncarcinogenic (as appropriate) risk from this analyte.
NC = not calculated.

Table 6-15
Summary of Remedial Goal Options for Surface Water at Site 16

Remedial Investigation Report
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Naval Air Station Whiting Field
Milton, Florida

Analyte	Exposure Point Concentration	Total Excess Lifetime Cancer Risk (Based on Risk to Resident (adult and child)			Total Hazard Index (Based on Risk to Child Resident)			Florida Surface Water Cleanup Target Level[1]	Background Screening Concentration
		10^{-4}	10^{-5}	10^{-6}	3	1	0.1		
Inorganic Analytes ($\mu g/\ell$)									
Beryllium	0.21	7.0	0.7	0.07	NR	NR	NR	0.13	NB

[1] Florida Department of Environmental Protection Cleanup Target Levels, Chapter 62-777, Florida Administrative Code (FDEP, 1999).

Notes: $\mu g/\ell$ = micrograms per liter.
NR = not reported because the calculated remedial goal option exceeds the exposure point concentration.
NB = not detected in background sample.

- The total ELCR at Site 16 associated with ingestion of soil by a hypothetical future resident, current and hypothetical future trespasser, and hypothetical future occupational worker exceeds Florida's target risk level of concern (1×10^{-6}) due primarily to carcinogenic PAHs and arsenic.

- Noncancer risk levels for soil, subsurface soil, and surface water meet the USEPA and FDEP target HI of one.

- The central tendency risks from surface soil and surface water to a hypothetical current and future trespasser, and a hypothetical future occupational worker (soil only) met the Florida level of concern(1×10^{-6}) for Site 16. Central tendency residential risks remain slightly above the FDEP target levels. The hypothetical future residential groundwater risks (carcinogenic and noncarcinogenic) remain above the FDEP target risk levels, but provide the risk managers and decision makers with a perspective of the hypothetical risk range to future residents.

7.0 ECOLOGICAL RISK ASSESSMENT

The Ecological Risk Assessment (ERA) evaluates actual and potential adverse effects to ecological receptors associated with exposure to chemicals from Site 16, the Open Disposal and Burning Area, at NAS Whiting Field. The ERA for Site 16 follows the methodologies described in the NAS Whiting Field GIR (HLA, 1998), and current guidance materials for ERAs at Superfund sites including the following:

- *Risk Assessment Guidance for Superfund Environmental Evaluation Manual* (USEPA, 1989b)
- *Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference* (USEPA, 1989c)
- *Framework for Ecological Risk Assessment* (USEPA, 1992b)
- *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (USEPA, 1997b)
- Supplemental Guidance to RAGS: Region 4 Bulletins on Ecological Risk Assessment (USEPA, 1995c)
- *Proposed Guidelines for Ecological Risk Assessment* (USEPA, 1996c)

Risk assessment guidance included in the USEPA "Eco Update" bulletins (1991d, 1992e, and 1992f) and recent publications (e.g., Maughan, 1993; Suter, 1993) were also consulted.

This ERA was conducted to determine if ecological receptors are potentially exposed to contaminants from Site 16 at concentrations that could cause adverse ecological effects. The Site 16 ERA consists of the following eight subsections:

- Site Characterization (Section 7.1) describes current ecological conditions at the site,
- Problem Formulation (Section 7.2) establishes the goals and focus of the assessment and identifies major factors to be considered,
- Hazard Assessment and Selection of Ecological Chemicals of Potential Concern (ECPCs) (Section 7.3) reviews the analytical data and identifies chemicals present at the site that may pose ecological risks,
- Exposure Assessment (Section 7.4) identifies complete exposure pathways and quantifies the magnitude and frequency of exposure,
- Ecological Effects Assessment (Section 7.5) identifies potential adverse effects to ecological receptors associated with the chemicals of concern identified in Section 7.3,
- Risk Characterization (Section 7.6) integrates exposure and concentration-toxicity response information to derive a likely estimate of adverse effects,

- Uncertainties (Section 7.7) identifies assumptions of the ERA process that may influence the risk assessment conclusions, and

- Summary of Ecological Risk (Section 7.8).

<u>7.1 SITE CHARACTERIZATION</u>. NAS Whiting Field Site 16 is approximately 12 acres in size. The site is located in the southwest portion of NAS Whiting Field, approximately 350 feet west of the Wastewater Treatment Plant (see Figure 1-2). Site 16 was used as the facility's primary waste disposal area from 1943 to 1965. The disposed waste consisted of general municipal refuse and waste generated from aircraft operation and maintenance (including paints, paint-stripping wastewater, solvents, waste oil, and hydraulic fluids). PCB-contaminated transformer oil may also have been disposed of at the site. An estimated volume of 3,000 to 4,000 tons of waste was reportedly disposed of at the site annually (Geraghty and Miller, 1986). To reduce waste volume, the wastes were burned, using spent diesel fuel as an accelerant.

The topography of Site 16 slopes toward Clear Creek, which is located 450 feet west of the site. Although overland transport of surface water runoff toward Clear Creek is possible, most of the on-site rainfall infiltrates directly into the ground due to the silty sand soil at Site 16.

A less than 0.1 acre ephemeral wetland is located along the site's eastern boundary. Because much of the site was disturbed by the trench and fill operations, it is very likely that this wetland is the result of subsidence within an old trench. The ephemeral wetland area is shallow (less than 2 feet deep) and is recharged by storm water runoff, thus it remains dry for most of the year. The ephemeral wetland is not likely to provide suitable habitat for aquatic receptors. However, any standing water present may provide an occasional source of drinking water for small terrestrial animals (amphibians, reptiles, mammals, and birds).

As shown in the Site 16 vegetative cover map (Figure 7-1), the landfill area of Site 16 is characterized as planted pine forest. In addition to slash pine (*Pinus elliotti*) and long-leaf pine (*P. palustris*), other saplings, shrubs and herbaceous plants commonly found in the planted pine area and herbaceous layer of Site 16 include: Red maple (Acer rubrum), ragweed (*Ambrosia* sp.), broomsedge (*Andropogon* sp.), yellow buttons (*Balduina angustifolia*), Spanish needles (*Bidens bipinnata*), beauty berry (*Callicarpa americana*), Goldenaster (*Chrysopsis sp.*), rattle box (*Crotalaria sp.*), Florida beggarweed (*Desmodium tortusosum*), buttonweed (*diodia virginiana*), yellow hessamine (*Gelsemium sempervirens*), moss verbena (*Glandularia pulchella*), Bladder-pod (*Glottidium vesicarium*), cudweed (*Gnaphalium sp.*), buttermint (*Hyptis mutabilis*), morning glory (*Ipomoea cordatotriboba*), cypress-vine (*Ipomoea quamoclit*), red cedar (*Juniperus silicicola*), Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*lonicera japonica*), False loosestrife (*ludwigia sp.*), wireweed (*Polygonella gracilis*), Mexican clover (*Richardia brasiliensis*), willow tree (*Salix nigra*), yellow wood sorrel (Oxalis stricta), rustweed (*Polypremum procumbens*), oaks (*Quercus* spp.), blackberry vine (*Rubus* spp.), poison ivy (*Toxicodendron radicans*), yaupon holly (*Ilex vomitoria*), goldenaster (*Pityopis graminifolia*), common nightshade (*solanum americanum*), goldenrod (*solidago sp.*), verbena (*Verbena brasiliensis*), skunk

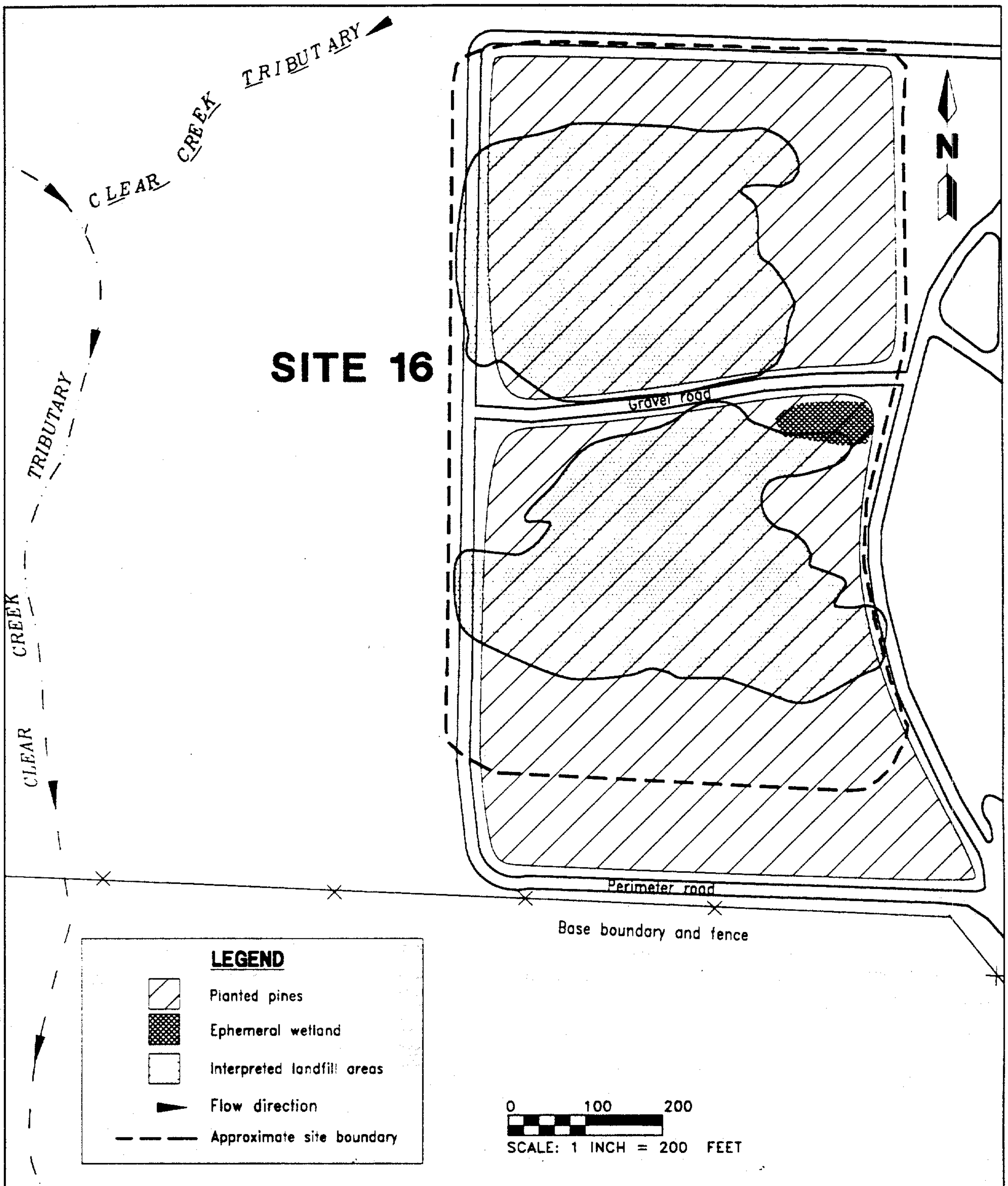

FIGURE 7-1
SITE 16, VEGETATIVE COVER MAP

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REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND BURNING AREA

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daisy (*verbesian enceliodies*), grape vine (*vitis sp.*) and greenbriar (*Smilax* spp.). A complete list of vegetative species occurring at Site 16 is provided in Appendix G of the GIR (HLA, 1998).

NAS Whiting Field maintains a program for planting and harvesting of pine trees, primarily long-leaf and slash pines. The planted pine area of Site 16 is subject to controlled burns and timber harvesting activities. As part of the ecosystem management plan, planted pine forests undergo periodic burning, usually once every four years, and selective thinning of long-leaf and slash pines every eight to ten years. These forestry management activities provide a variety of habitats and food sources for wildlife and other ecological receptors. Many of the pine trees were severely damaged or upturned during the 1995 hurricanes (Erin and Opal). Many of these trees were removed by base personal leaving large openings in the canopy. Site 16 is typical of uplands pine forests of the southeastern United States. The forested area at Site 16 is contiguous with a mature planted pine forest that surrounds the northern and southern boundaries of the site. A mowed grasses open area (area around the wastewater treatment plant) is located east of the site. NAS Whiting Field Site 39, Clear Creek Floodplain, is west of the site. The vegetative cover at Site 39 is characterized as a hardwood forested wetland.

Southeastern pine forests provide habitat for a diverse array of birds, including insectivorous gleaners of pine needles and bark, flycatchers, seed-eaters, and nocturnal and diurnal aerial predators (Wolfe et al., 1988). The pine flatwoods at and surrounding Site 16 are likely to host such an assemblage of species. Birds of prey, such as owls and hawks, may also nest in these wooded areas.

It is likely that the terrestrial invertebrate biomass at Site 16 serves as a forage base for a variety of wildlife species, including adult amphibians, reptiles, small birds, and small mammals. Small reptiles, mammals, and birds may use the forested pine area for protection. Predatory birds and mammals inhabiting the pine flatwood areas may also be attracted to the site.

Mammals and birds that may occur in the planted pine area of Site 16 include the hispid cotton rat (*Sigmodon hispidus*), cotton mouse (*Peromyscus gossypinus*), short-tailed shrew (*Blarina brevicauda*), American robin (*Turdus migratorius*), and eastern meadowlark (*Sturnella magna*). Predatory mammals and birds such as the red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), great-horned owl (*Bubo virginianus*), and the red-tailed hawk (*Buteo jamaicensis*) may also forage in the area of Site 16.

Site 16 groundwater may discharge to the surface water of Clear Creek, which is located approximately 450 feet downgradient and west of the site. Clear Creek, which is classified by the FDEP as Class III surface water, is a tributary to Blackwater River, located to the south. Florida Class III surface water are suitable for the propagation of fish and aquatic life. Blackwater River is classified as an Outstanding Florida River, which is considered to be of exceptional ecological significance. Groundwater discharge to the surface water of Clear Creek is qualitatively evaluated as part of the ERA for Site 16. However, the section of Clear Creek that receives groundwater from Site 16 is included as part of NAS Whiting Field Site 39, Clear Creek Floodplain. The ERA for Site 39 will present the results of surface water and sediment sampling in Clear Creek and provide further information on whether or not Site 16 is a potential source of contamination to Clear Creek.

7.2 PROBLEM FORMULATION. The problem formulation is the initial step of the ERA process. Problem formulation is composed of identification of receptors, identification of exposure pathways for those receptors, and selection of assessment and measurement endpoints based on information gathered from the site characterization.

7.2.1 Identification of Receptors Ecological receptors that may potentially utilize the available planted pine forest habitat at Site 16 include terrestrial wildlife (i.e., mammals, birds, reptiles, and adult amphibians), terrestrial plants, and soil invertebrates. Terrestrial flora and fauna potentially using NAS Whiting Field are identified in the GIR (HLA, 1998). Freshwater aquatic receptors in Clear Creek downgradient of Site 16 are evaluated in the ERA because groundwater from Site 16 may potentially migrate to the surface water of Clear Creek.

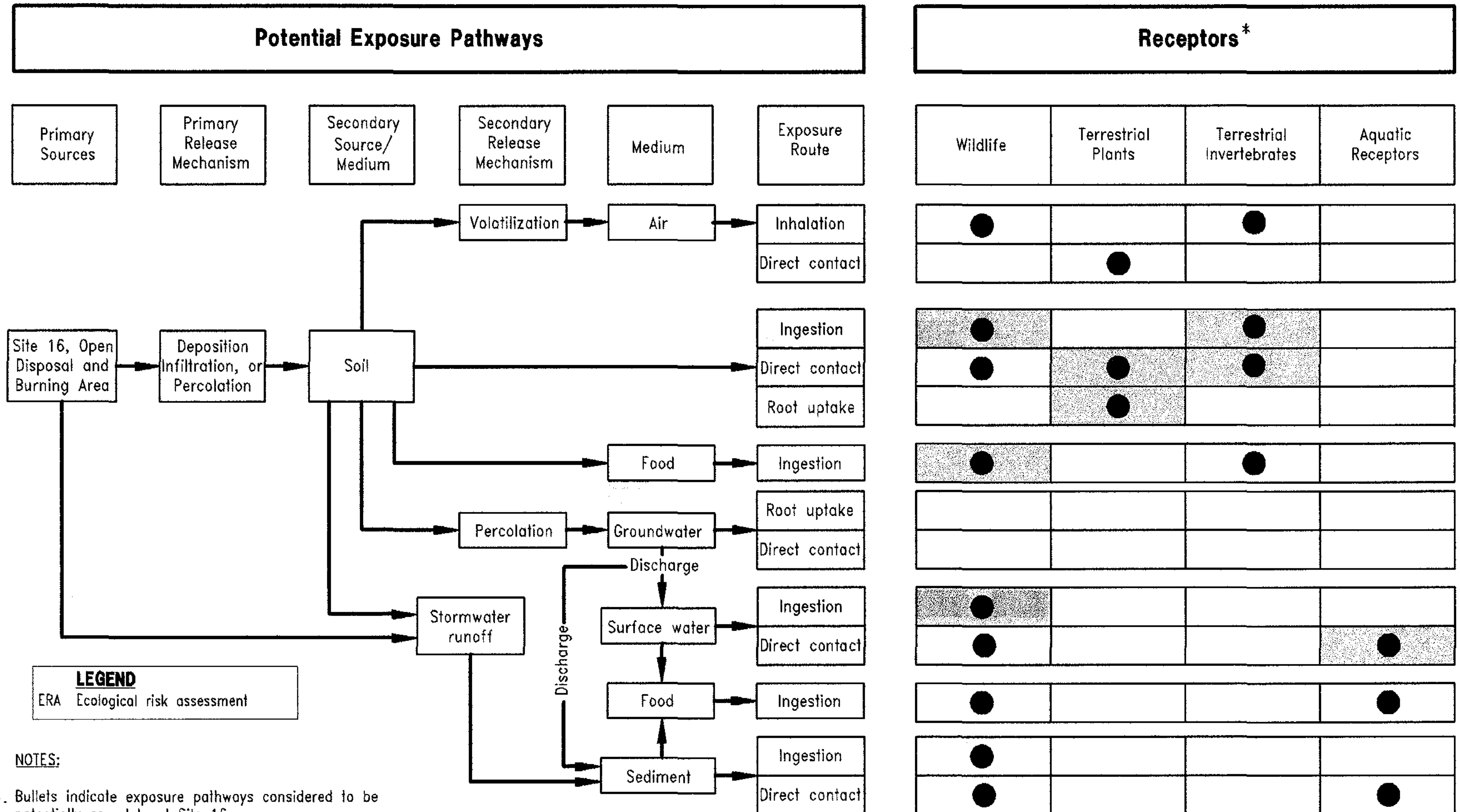
Certain species that potentially reside at NAS Whiting Field are protected by Federal and/or State laws. A list of state and federally protected species is provided in the GIR (HLA, 1998). Observations made during an ecological survey of NAS Whiting Field indicate that no state or federally listed rare, threatened, or endangered species or species of concern are known or likely to inhabit Site 16 (Nature Conservancy, 1997).

7.2.2 Identification of Exposure Pathways Exposure pathways are identified for four groups of receptors (terrestrial wildlife, terrestrial plants, soil invertebrates, and aquatic receptors). A complete exposure pathway includes a source of contamination, an exposure route, and a receptor. A conceptual model of the exposure pathways from source to ecological receptors is depicted in the contaminant pathway model on Figure 7-2.

All potential routes of exposure are considered in the ERA and are presented in the contaminant pathway model. The model differentiates between those exposure routes that are quantitatively evaluated and those that are qualitatively discussed. This limitation is necessary to focus the risk evaluation on those pathways for which contaminant exposures are the highest and most likely to occur. Those pathways that cannot be quantitatively evaluated, due to a lack of toxicological information, are qualitatively discussed and addressed as uncertainties. The general approach used to identify exposure pathways for the four groups of receptors is explained below.

Terrestrial Wildlife. Terrestrial wildlife may be exposed to contaminants in surface soil, surface water, and food items contaminated as a result of ingestion, dermal adsorption, and inhalation of fugitive dust and volatile emissions.

The drinking water exposure pathway is expected to occur only occasionally, following periods of heavy rain. However, the ERA assumes that the surface water at Site 16 is used as the primary drinking water source for terrestrial wildlife throughout the year. Since the ephemeral wetland remains dry for most of the year, aquatic organisms are not expected to be present. Therefore, ingestion of aquatic food items (i.e., fish and aquatic invertebrates) by terrestrial organisms is not evaluated in the ERA. The Site 16 ERA will evaluate only exposures to surface soil, surface water, and food items potentially containing constituents that have bioaccumulated from the surface soil.



Medium	Exposure Route	Wildlife	Terrestrial Plants	Terrestrial Invertebrates	Aquatic Receptors
Air	Inhalation	●		●	
Air	Direct contact		●		
Soil	Ingestion	●		●	
Soil	Direct contact	●	●	●	
Soil	Root uptake		●		
Food	Ingestion	●		●	
Groundwater	Root uptake				
Groundwater	Direct contact				
Surface water	Ingestion	●			
Surface water	Direct contact	●			●
Food	Ingestion	●			●
Sediment	Ingestion	●			
Sediment	Direct contact	●			●

LEGEND
ERA Ecological risk assessment

NOTES:

1. Bullets indicate exposure pathways considered to be potentially complete at Site 16.
2. Shading indicates the exposure pathways that are quantitatively evaluated for receptors in the Site 16 ERA. Nonshaded pathways are evaluated qualitatively. They were not evaluated quantitatively due to the lack of toxicity information or because they were not considered a significant pathway or data to quantatively evaluate these pathways are not available. The ingestion exposure routes for terrestrial invertebrates include the ingestion of soil and food items containing chemicals accumulated from Site 16 surface soil.

FIGURE 7-2
CONTAMINANT PATHWAY MODEL FOR SITE 16 ECOLOGICAL RECEPTORS

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Dermal adsorption is considered to be a negligible exposure pathway relative to the ingestion pathway because the presence of fur, feathers, or a chitinous exoskeleton is likely to prevent contamination from coming in direct contact with the skin (personal communication with Ted Simon, USEPA Region IV, September 1997). In addition, soil trapped in the fur or feathers is likely to be ingested during grooming or preening activities, which are evaluated as part of the indirect ingestion exposure pathway.

Exposure via inhalation of fugitive dust is not likely to be a significant exposure pathway because the vegetation at Site 16 would limit the release of fugitive dust. Although volatile constituents were detected in the surface soil of Site 16, exposures associated with VOCs are not evaluated in the ERA because of the low detection frequency and concentration of VOCs in the surface soil. Neither toluene nor xylene, the only VOCs detected in surface soil, were retained as ECPCs. In addition, no evidence of burrowing animals and/or burrows was noted at Site 16 during the October 1995 biological field investigation conducted by HLA ecologists, although this habitat may be suitable to these receptors.

Potential contaminant exposures for reptiles and amphibians exist at NAS Whiting Field; however, ingestion toxicity data and bioaccumulation factors are generally not available for these receptors. Therefore, potential risks to reptiles and amphibians from ingestion of affected surface soil and food items will be qualitatively addressed in the Uncertainties Section (Section 7.7) of the ERA.

Terrestrial Plants and Invertebrates. Terrestrial plants and soil invertebrates may be exposed to contamination in surface soil by direct contact with and root uptake (plants) or ingestion (invertebrates) of soil. The ingestion exposure routes include the ingestion of soil and food items containing chemicals accumulated from Site 16 surface soil. The inhalation exposure route is not evaluated for terrestrial plants and invertebrates due to the reasons discussed above for terrestrial wildlife. Because the depth to groundwater is approximately 10 to 15 feet bls, which is below the root zone of most Site 16 plants, it is unlikely that terrestrial plants will be exposed to potential groundwater contamination. Terrestrial plants and soil invertebrates may also be exposed to contamination in subsurface soil by direct contact or ingestion of subsurface soil. However, this exposure pathway is only qualitatively evaluated as site-specific toxicity data are lacking (i.e., soil toxicity tests were not conducted using subsurface soil). In addition, there is uncertainty associated with comparing the surface soil screening benchmarks to concentrations detected in subsurface soil. The surface soil benchmarks employed in this assessment are based on laboratory toxicity tests, using sensitive species and species in their early life stages. It is unlikely that the most sensitive plant species and life stages would be exposed to subsurface soil.

Aquatic Receptors. Exposure pathways evaluated for aquatic receptors in Clear Creek downgradient of Site 16 (including invertebrates, plants, amphibians, and fish) include direct contact with groundwater (as it discharges to the surface water of Clear Creek). Although direct contact with the surface water and sediment and ingestion of sediment and food items is possible, these pathways will be evaluated as part of the ERA for Site 39, Clear Creek Floodplain.

A qualitative screening evaluation of Site 16 groundwater migration to surface water and potential adverse effects to aquatic receptors in Clear Creek will be completed as part of this ERA. It should be noted that the purpose of this evaluation is not to predict actual surface water and sediment conditions in Clear Creek. Surface water and sediment data from Clear Creek downgradient of Site 16 will be evaluated as part of the ERA for the Site 39, Clear Creek Floodplain.

<u>7.2.3 Identification of Endpoints</u> The assessment and measurement endpoints selected for the Site 16 ERA are listed in Table 7-1. Assessment endpoints represent the ecological component to be protected, whereas the measurement endpoints approximate or provide a measure of the achievement of the assessment endpoint. One of the assessment endpoints selected for the Site 16 ERA is the survival and maintenance of receptor populations and communities at Site 16. The measurement endpoints used to gauge the likelihood of population- and community-level effects are chemical-specific toxicological benchmark values derived from the literature that are based on laboratory-measured survival, growth, and reproductive effects. Table 7-1 presents the assessment endpoint, endpoint species, measurement endpoint, and decision point (i.e., the outcome at which additional evaluation may be warranted).

Three questions were developed to gauge potential risks associated with exposure to Site 16 surface soil and surface water. These questions are designed for multiple species and trophic levels and represent both individual and community dynamics. Questions for the Site 16 ERA are listed below.

1. ECPCs in the surface soil are not present at concentrations sufficiently high enough to reduce the survival and growth of terrestrial plant and invertebrate communities at Site 16.

2. ECPC concentrations in plants and invertebrates are not sufficiently high enough to adversely affect foraging small mammal or bird populations following consumption of contaminated prey.

3. Bioaccumulating chemical are not present at concentrations sufficiently high enough to reduce survivability, growth, or reproduction in top predators (e.g., foxes and owls).

<u>7.3 HAZARD ASSESSMENT AND SELECTION OF ECPCS</u>. The hazard assessment includes a review of analytical data and selection of ECPCs. ECPCs represent analytes detected in environmental media (i.e., surface soil, surface water, and groundwater) that are considered in the ERA and could present a potential risk for ecological receptors. The process for selecting ECPCs is depicted on Figure 7-3. Additional details regarding the ECPC selection process are provided in Subsection 2.4.2 of the GIR (HLA, 1998). Analytical data for Site 16 were evaluated and validated for use in risk assessment pursuant to national guidance, *Guidance for Data Useability in Risk Assessment (Parts A and B)* (USEPA, 1992a).

Following the data validation step, analytes in surface soil, surface water, and groundwater were not selected as ECPCs if the analyte was detected in 5 percent or fewer of the samples analyzed and not present in any other media. Calcium, magnesium, potassium, and sodium are excluded as ECPCs for surface water and groundwater. In addition to these analytes, iron is also excluded as an ECPC for surface soil. These analytes are considered to be essential nutrients and not toxic. The rationale for eliminating essential nutrients as ECPCs is provided in the GIR (HLA, 1998).

Table 7-1
Ecological Risk Assessment Endpoints
Selected for Site 16

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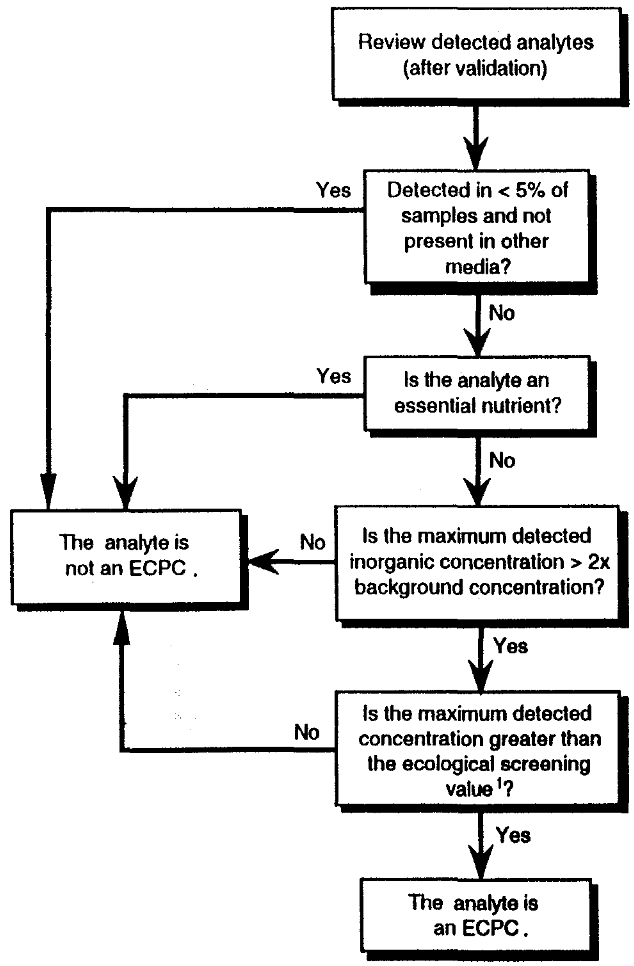
Assessment Endpoint	Receptor	Measurement Endpoint	Decision Point
Survival and growth of plant communities.	Terrestrial Plants	Germination of lettuce seeds exposed to surface soil samples from Site 16 in laboratory toxicity tests.	Significant differences ($P \leq 0.05$) in germination of lettuce seeds exposed to Site 16 surface soil samples as compared to control samples.
Survival and growth of terrestrial invertebrate communities.	Terrestrial Invertebrates	Survival and growth of earthworms exposed to surface soil samples from Site 16 in laboratory toxicity tests.	Significant differences ($P \leq 0.05$) in survival and/or growth of earthworms exposed to Site 16 surface soil samples as compared to control samples.
Survival and maintenance of wildlife populations.	Terrestrial Wildlife Species	Oral chemical doses (mg/kg BW/day) based on measured adverse effects on growth, reproduction, or survival (i.e., NOAEL, LOAEL, and LD_{50} studies) of mammalian or avian laboratory test populations.	Comparison of potential dietary exposures in mammalian and avian wildlife with literature-derived RTVs. (HQ >1 indicate potential risks.)

Notes: P = probability
$\leq$ = less than or equal to.
mg/kg = milligrams per kilogram.
BW/day = body weight per day.
NOAEL = no observed adverse effect level.
LOAEL = lowest observed adverse effect level.
LD_{50} = lethal dose to 50 percent of a test population.
RTV = reference toxicity value.
HQ = hazard quotient.
> = greater than.



NOTES:
NAS = Naval Air Station
ECPC = ecological chemical of potential concern
> = greater than
< = less than
x = times
[1] Media-specific ecological screening values include the Dutch Soil Criteria for surface soil ECPCs and the U.S. Environmental Protection Agency - Region 4 Surface Water Chronic Screening Values for groundwater.

FIGURE 7-3
ECOLOGICAL CHEMICAL OF POTENTIAL CONCERN SELECTION PROCESS

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Inorganic chemicals representative of background conditions are not selected as ECPCs. In accordance with USEPA Region IV guidance (USEPA, 1991a), an inorganic analyte is not selected as an ECPC if the maximum detected concentration is less than 2 times the average detected inorganic concentration in background samples.

The maximum detected concentrations are compared against representative site-specific background surface soil and groundwater concentrations to eliminate chemicals that are unlikely to be site related. Surface water data were not compared to background values because no comparable surface water background samples were available. The surface water at Site 16 is an isolated water body that was created as a result of excavation activities. Neither Big Coldwater Creek, Clear Creek, nor ponds in the area are similar to the ephemeral wetland at Site 16.

Site-specific background investigations of surface soil and groundwater were conducted at NAS Whiting Field, and the findings are presented in Subsections 3.3.1 and 3.3.3 of the GIR, respectively (HLA, 1998). The site-specific background study used to establish background screening values for Site 16 surface soil consists of nine surface soil samples (BKG-SL-02, BKG-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00301, BKS00401, and BKS00501) and one duplicate sample (BKS00201D). These samples were collected from Troup, Dothan, Lucy, and Bonifay soil types, which are considered the most geologically similar to the soil from Site 16. The site-specific background study used to establish background screening values for groundwater consists of seven groundwater samples (BKG00101, BKG00102, BKG00103, BKG00201, BKG00202, BKG00203, and BKG00301) and one duplicate sample (BKG00101D) collected from monitoring wells upgradient of any potential site-related contamination.

Analytes that exceed the background screening concentration and are not essential nutrients are also screened against ecological screening values for surface soil and groundwater. The surface soil ecological screening values are the Dutch Soil Criteria "A", which refer to background concentrations in surface soil issued by the U.S. Fish and Wildlife Service (Beyer, 1990). The groundwater ecological screening values are the fresh surface water chronic screening values for hazardous waste sites issued by USEPA Region IV (USEPA, 1995b). If the maximum detected concentration of an analyte for surface soil exceeds the respective ecological screening value, the analyte is retained as an ECPC for terrestrial wildlife, terrestrial plants, and soil invertebrates. Because ecological screening values are unavailable for surface water exposures to terrestrial wildlife, all analytes detected in surface water (with the exception of essential nutrients) are retained as ECPCs. If the maximum detected concentration of an analyte exceeds the groundwater ecological screening value, the analyte is retained as an ECPC for aquatic receptors.

Twenty surface soil samples (16-SL-01 through 16-SL-03 and 16S00101 through 16S01701 with duplicates at 16S00101D and 16S01001D) were collected at Site 16 (see Figure 3-3 or 5-11). Samples 16-SL-01 through 16-SL-03 were collected as part of the Phase IIA investigation in August 1992, and samples 16S00101 through 16S01701 were collected as part of the Phase IIB investigation in December 1995. Surface soil samples were analyzed for VOCs, SVOCs, pesticides and PCBs, and inorganics. A single unfiltered surface water sample, 16W00101, was collected from the ephemeral wetlands. Unfiltered groundwater results were used to evaluate potential ecological risks to Clear Creek. A discussion of which groundwater samples were used to evaluate both human health and ecological risks is provided in Subsection 6.3.

Tables 7-2 and 7-4 present a summary of the respective surface soil, and groundwater analytical data and the following information: frequency of detection, range of reporting limits, range of detected concentrations, average of detected concentrations, background screening concentrations, ecological screening values, 95 percent UCLs, and selected ECPCs. A summary of the surface water data including the frequency of detection, range of reporting limits, range of detected concentrations, and selected ECPCs is presented in Table 7-3.

As shown in Table 7-2, ECPCs selected for the surface soil samples collected at Site 16 include 13 SVOCs (carbazole, bis(2-ethylhexyl)phthalate, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno (1,2,3-cd) pyrene, phenanthrene, and pyrene), 1 PCB (Aroclor-1254), 5 pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Aroclor-1254, and dieldrin), and 12 inorganic constituents (aluminum, arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, silver, vanadium, and zinc).

As shown in Table 7-3, ECPCs selected for the surface water sample collected from the ephemeral wetland at Site 16 include two inorganic analytes (aluminum and lead).

As shown in Table 7-4, ECPCs selected for the unfiltered groundwater samples collected at Site 16 include three VOCs (benzene, TCE, and xylenes), one SVOC (-bis(2-ethylhexyl)phthalate), one pesticide (4,4'-DDT), and ten inorganics (aluminum, barium, cobalt, copper, cyanide, iron, lead, manganese, vanadium, and zinc).

<u>7.4 EXPOSURE ASSESSMENT</u>. The purpose of the ecological exposure assessment is to estimate or measure the amount of an ECPC to which an ecological receptor may be exposed. The following sections briefly describe how contaminant exposures are estimated or measured for wildlife, terrestrial plants, and invertebrates at Site 16 and aquatic receptors in Clear Creek downgradient of Site 16. The contaminant pathway model (Figure 7-2) provides a summary of the potential exposure pathways that exist at Site 16 for each group of receptors. Additional details regarding the exposure assessment are provided in the GIR (HLA, 1998).

<u>7.4.1 Calculation of EPCs</u> The EPC is a representative concentration used for evaluating risks throughout this ERA. RME and central tendency (CT) concentrations are derived for each ECPC. Because the sample sizes for both the surface soil and groundwater data sets are greater than ten, the RME value is equal to the lesser of the maximum detected concentration and the 95 percent UCL calculated on the log-transformed arithmetic mean (USEPA, 1992c). One-half of the detection limit is used to calculate the 95 percent UCL. If potential risks are predicted based on the RME scenario, then the CT exposure scenario is also evaluated. The CT exposure concentration is represented by the arithmetic mean of all samples. One-half of the detection limit is also used as a surrogate value for sample results that are below the detection limit. Because only one surface water sample was collected at Site 16, the EPC for surface water ECPCs is equal to the detected concentration for each ECPC.

Tables 7-2, 7-3, and 7-4 present the EPCs for surface soil, surface water, and groundwater ECPCs, respectively.

<u>7.4.2 Terrestrial Wildlife</u> Exposure routes for wildlife receptors include direct ingestion of soil and surface water and indirect ingestion of food containing site-related chemicals. The actual amount of an ECPC taken in by

Table 7-2
Selection of Ecological Chemicals of Potential Concern in Surface Soil Associated with Site 16

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Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentration Range[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	Ecological Screening Value[5]	Chemical of Ecological Concern[6]	95th % UCL[7]	Average of All Samples[8]	Exposure Point Concentration	
										RME[9]	CT[10]
Volatiles Organic Compounds (µg/kg)											
Toluene	1/20	6 to 13	1	1	ND	50	No[12]				
Xylenes (total)	3/20	6 to 13	1 to 5	2.7	ND	50	No[12]				
Semivolatile Organic Compounds (µg/kg)											
Anthracene	1/20	350 to 420	95	95	ND	100	No[11, 12]				
Benzo(a)anthracene	4/20	350 to 420	56 to 2,300	668	ND	[15]100	Yes	351	286	351	286
Benzo(a)pyrene	5/20	350 to 840	71 to 3,100	746	ND	100	Yes	372	328	372	328
Benzo(b)fluoranthene	4/20	350 to 840	86 to 3,600	1,084	ND	[15]100	Yes	412	369	412	369
Benzo(g,h,i)perylene	3/20	350 to 420	120 to 1,200	603	ND	[15]100	Yes	299	251	299	251
Benzo(k)fluoranthene	3/20	350 to 420	73 to 3,200	1,204	ND	[15]100	Yes	388	343	388	343
Carbazole	1/17	350 to 420	97	97	ND	NA	Yes	202	185	97	97
Chrysene	5/20	350 to 420	54 to 3,200	741	ND	[15]100	Yes	388	327	388	327
Dibenzo(a,h)anthracene	2/20	350 to 420	110 to 700	405	ND	[15]100	Yes	240	212	240	212
Fluoranthene	4/20	350 to 420	59 to 2,300	676	ND	100	Yes	344	288	344	288
Indeno(1,2,3-cd)pyrene	4/20	350 to 420	62 to 1,900	573	ND	[15]100	Yes	324	266	324	266
Phenanthrene	2/20	350 to 420	52 to 440	246	ND	100	Yes	233	196	233	196
Pyrene	4/20	350 to 420	44 to 1,700	516	ND	100	Yes	314	256	314	256
bis(2-Ethylhexyl)phthalate	7/20	350 to 420	43 to 116.5*	70.1	80	100	Yes	204	149	117	117

See notes at end of table.

Table 7-2 (Continued)
Selection of Ecological Chemicals of Potential Concern in Surface Soil Associated with Site 16

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Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentration Range[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	Ecological Screening Value[5]	Chemical of Ecological Concern[6]	95th % UCL[7]	Average of All Samples[8]	Exposure Point Concentration	
										RME[9]	CT[10]
Pesticides and PCBs (µg/kg)											
4,4'-DDD	2/20	3.6 to 21	2.1 to 18	10.1	ND	2.5	Yes	6.2	4.4	6.2	4.4
4,4'-DDE	9/20	3.6 to 21	2.6* to 100	30.2	ND	2.5	Yes	37	15	37	15
4,4'-DDT	9/20	3.6 to 21	3.25* to 89	20.8	ND	2.5	Yes	19.9	10.8	19.9	10.8
Aroclor-1254	2/20	36 to 210	36 to 130	83	ND	20	Yes	68	46	68	46
Aroclor-1260	1/20	36 to 210	79*	79	ND	20	No[11]				
Dieldrin	8/20	3.6 to 21	2.5 to 130	31	29	0.5	Yes	31.5	14.7	31.5	14.7
alpha-Chlordane	3/20	1.8 to 99	1.6 to 9.4*	4.5	ND	100	No[12]				
gamma-Chlordane	3/20	1.8 to 99	1 to 5.95*	3.1	ND	100	No[12]				
Inorganic Analytes (mg/kg)											
Aluminum	20/20	40 to 40	1,890* to 18,600	8,724	13,500	50	Yes	11,271	8,724	11,271	8,724
Antimony	1/20	2.7 to 12	5.9	5.9	8	3.5	No[13]				
Arsenic	20/20	2	0.7* to 12.1	2.8	[16]4.6	10	Yes	3.8	2.8	3.8	2.8
Barium	20/20	40	4.45* to 257	36.8	18.8	165	Yes	63.4	36.8	63.4	36.8
Beryllium	15/20	1	0.06 to 0.295*	0.12	0.36	1.1	No[12]				
Cadmium	17/20	0.61 to 1	0.21 to 7.6	1.3	0.98	1.6	Yes	2.1	1.2	2.1	1.2
Calcium	20/20	1,000	70.8 to 2,350	584	446	NA	No[14]				
Chromium	20/20	2	3.2 to 29.2	10.6	10	0.4	Yes	15	10.6	15	10.6
Cobalt	11/20	10	0.69 to 4.1	1.7	2.8	20	No[12]				
Copper	19/20	5	2.9 to 202	34.1	8	40	Yes	78.3	32.5	78.3	32.5
Cyanide	8/20	0.24 to 0.5	0.12* to 0.51	0.2	0.28	5.0	No[12]				
Iron	20/20	20	1,390* to 48,900	9,240	7,744	200	No[14]				

See notes at end of table.

Table 7-2 (Continued)
Selection of Ecological Chemicals of Potential Concern in Surface Soil Associated with Site 16

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Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentration Range[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	Ecological Screening Value[5]	Chemical of Ecological Concern[6]	95th % UCL[7]	Average of All Samples[8]	Exposure Point Concentration	
										RME[9]	CT[10]
Inorganic Analytes (mg/kg) (Continued)											
Lead	20/20	0.6 to 1	4.4 to 759	110	10.2	50	Yes	473	110	473	110
Magnesium	20/20	1,000	34.2* to 443	157	244	NA	No[14]				
Manganese	20/20	3	5.25* to 372	129	324	100	Yes	296	129	296	129
Mercury	9/20	0.08 to 0.1	0.05 to 0.65	0.17	0.12	0.1	Yes	0.13	0.1	0.13	0.1
Nickel	11/20	2.4 to 8	2.3 to 26	7.2	6.8	30	No[12]				
Potassium	6/20	133 to 1,000	69.7 to 288.8*	159	177	NA	No[14]				
Selenium	7/20	0.41 to 1	0.15 to 0.345*	0.21	0.46	0.81	No[12, 13]				
Silver	6/20	0.33 to 2	0.87 to 7.1	2.8	0.7	2.0	Yes	2.3	1.4	2.3	1.4
Sodium	18/20	1,000	114 to 361	178	382	NA	No[13, 14]				
Thallium	2/20	0.46 to 2	0.13 to 0.18	0.16	1.16	1.0	No[12, 13]				
Vanadium	20/20	10 to 10	3.3* to 28.9	15.8	19	2.0	Yes	21.1	15.8	21.1	15.8
Zinc	20/20	4 to 4	3.75* to 773	104	15.8	50	Yes	412	104	412	104

[1] Frequency of detection is the number of samples in which the analyte was detected in relation to the total number of samples analyzed (excluding rejected values).
[2] The value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect value, one-half of the detection limit is used as a surrogate for concentration for the sample where a nondetection was reported.
[3] The average of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples. Background screening values for organic analyte values are one times the average of detected concentrations. Organic values are included for comparison purposes only (i.e., not used to select ecological contaminant of potential concerns).
[5] The ecological screening values are the Region IV Recommended Ecological Screening values for Soil. USEPA Region IV memorandum 4WD-OTS, December 22, 1998.
[6] These chemicals are retained for further evaluation in the ecological risk assessment.
[7] The 95% UCL is calculated on the log-transformed average of all samples using the formula provided in the USEPA *Supplemental Guidance to RAGS: Calculating the Concentration Term* (USEPA, 1992d). The 95% UCL is not calculated when there are less than 10 total samples.
[8] The average of all samples assigns a value of one-half of the detection limit as a surrogate concentration for nondetect values.
[9] The RME concentration is equal to the lesser of the maximum detected concentration or the 95th % UCL.

Notes continued on next page.

Table 7-2 (Continued)
Selection of Ecological Chemicals of Potential Concern in Surface Soil Associated with Site 16

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[10] The CT exposure point concentration (EPC) is equal to the lesser of the average of all samples or the maximum exposure point concentration.
[11] The analyte was detected in less than 5 percent of the samples and was not detected in any other media.
[12] The maximum detected concentration is less than the ecological screening value.
[13] The maximum detected concentration is less than the background screening concentration.
[14] The analyte is an essential nutrient and not considered toxic.
[15] The ecological screening value of benzo(a)pyrene is used as a surrogate value.
[16] The background screening concentration for arsenic is the average of surface and subsurface soil background concentration. For additional information, see Appendix I in the GIR (HLA, 1998).

Notes: Samples: 16-SL-01, 16-SL-02, 16-SL-03, 16S00101, 16S00201, 16S00301, 16S00401, 16S00501, 16S00601, 16S00701, 16S00801, 16S00901, 16S01001, 16S01101, 16S01201, 16S01301, 16S01401, 16S01501, 16S01601, 16S01701.
Duplicate samples: 16S00101D, 16S01001D.
Background samples: BKG-SL-01, BKG-SL-02, BKG-SL-06, BKG-SL-07, BKG-SL-08, BKG-SL-09, BKG-SL-10, BKS00101, BKS00201, BKS00401, BKS00501.
Background duplicate samples: BKG-SL-09A, BKS00201D.

% = percent.
UCL = upper confidence level.
RME = reasonable maximum exposure.
CT = central tendency.
μg/kg = micrograms per kilogram.
ND = not detected in any background sample.
* = average of a sample and its duplicate.
PCB = polychlorinated biphenyl.
DDD = dichlorodiphenyldichloroethane.
DDT = dichlorodiphenyltrichloroethane.
DDE = dichlorodiphenyldichloroethene.
mg/kg = milligrams per kilogram.
NA = not available.

Table 7-3
Selection of Ecological Chemicals of Potential Concern in Surface Water at Site 16

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Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit	Detected Concentration	Background Screening Concentration[2]	Chemical of Ecological Concern
Inorganic Analytes (μg/ℓ)					
Aluminum	1/1	200	758	654	Yes
Barium	1/1	200	28.6	72.6	No[3]
Beryllium	1/1	5	0.21	0.94	No[3]
Calcium	1/1	5,000	8,890	3,320	No[4]
Iron	1/1	100	730	964	No[3]
Lead	1/1	3	5.2	ND	Yes
Magnesium	1/1	5,000	1,170	2,430	No[4]
Manganese	1/1	15	4.4	42.8	No[3]
Potassium	1/1	5,000	2,780	1,530	No[4]
Sodium	1/1	5,000	1,120	4,770	No[4]
Zinc	1/1	20	29.2	200	No[3]

[1] Frequency of detection is the number of samples in which the analyte was detected in relation to the total number of samples analyzed (excluding rejected values).
[2] The background screening concentration is twice the average detected concentration for inorganic analytes in background samples.
[3] The detected concentration is less than the background screening concentration. Therefore, the analyte will not be evaluated further.
[4] Analyte is an essential nutrient and not considered toxic.

Notes: Sample: 16W00101.

μg/ℓ = micrograms per liter.

Table 7-4
Selection of Ecological Chemicals of Potential Concern in Unfiltered Groundwater at Site 16

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Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentration Range[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	USEPA Chronic Screening Values (μg/ℓ)[5]	Chemical of Ecological Concern	95th % UCL[6]	Average of All Samples[7]	Exposure Point Concentration RME[8]	Exposure Point Concentration CT[9]
Volatiles Organic Compounds (μg/ℓ)											
1,2-Dichloroethane	6/17	10 to 50	1 to 32	19	NA	2000	No[10]				
1,2-Dichloroethene (total)	6/17	10 to 50	1 to 50	16.5	NA	303	No[10]				
Benzene	7/17	10 to 50	1 to 820	428	NA	53	Yes	4,188	179	820	179
Chloroform	3/17	10 to 40	1	1	NA	289	No[10]				
Ethylbenzene	2/17	10 to 50	5 to 6	5.5	NA	453	No[10]				
Toluene	2/17	10 to 50	1	1	NA	175	No[10]				
Trichloroethene	5/17	10 to 50	2 to 7	3.8	NA	NSC	Yes	7.1	5.5	7	5.5
Xylenes (total)	1/17	10 to 50	1	1	NA	NSC	Yes	10.3	7.1	1	1
Semivolatile Organic Compounds (μg/ℓ)											
Naphthalene	3/17	10	1	1	NA	62	No[10]				
Phenol	3/17	10	4 to 8	5.7	NA	256	No[10]				
bis(2-Ethylhexyl)phthalate	7/17	10	1 to 53	9.5	NA	0.3	Yes	11.7	6.9	11.7	6.9
Pesticides and PCBs (μg/ℓ)											
4,4-DDT	2/17	0.1	0.14 to 0.15	0.15	NA	0.001	Yes	0.07	0.06	0.07	0.06
Inorganic Analytes (μg/ℓ)											
Aluminum	10/17	14.65 to 200	121 to 3,930	796	654	87	Yes	2,165	491	2,165	491
Antimony	1/17	8.6 to 60	17.4	17.4	20.4	160	No[10,11]				
Arsenic	4/17	0.5 to 10	0.6 to 3.6	1.5	ND	190	No[10]				
Barium	17/17	200	10* to 456	53.9	72.6	NSC	Yes	73	53.9	73	53.9

See notes at end of table.

Table 7-4 (Continued)
Selection of Ecological Chemicals of Potential Concern in Unfiltered Groundwater at Site 16

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Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentration Range[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	USEPA Chronic Screening Values (μg/ℓ)[5]	Chemical of Ecological Concern	95th % UCL[6]	Average of All Samples[7]	Exposure Point Concentration	
										RME[8]	CT[9]
Inorganic Analytes (μg/ℓ) (Continued)											
Beryllium	1/17	0.3 to 5	0.42	0.42	0.94	0.53	No[10,11]				
Cadmium	2/17	1.2 to 5	2.2 to 12.5	7.4	4.4	0.66	No[10]				
Calcium	15/17	236.5 to 308	623 to 78,800	16,462	3,320	NSC	No[12]				
Chromium	4/17	2 to 10	2.1 to 4.6	2.9	30	11	No[10,11]				
Cobalt	2/17	1.15 to 50	2.175* to 3	2.6	ND	NSC	Yes	76.7	18.2	3	3
Copper	6/17	1.1 to 25	1.4 to 11.9	4.2	10.8	6.54	Yes	26.8	7.5	11.9	7.5
Cyanide	1/17	1.5 to 5.2	12	12	7	5.2	Yes	2.3	1.8	2.3	1.8
Iron	14/17	41.2 to 100	7.25* to 68,600	5,538	964	1000	Yes	44,802	4,568	44,802	4,568
Lead	4/17	0.5 to 3	0.5 to 5.7	3.1	ND	1.32	Yes	3.2	1.6	3.2	1.6
Magnesium	17/17	NR	268.5* to 8,690	1,841	2,430	NSC	No[12]				
Manganese	17/17	0.5 to 15	1.3* to 1,370	188	42.8	NSC	Yes	1,652	188	1,370	188
Nickel	3/17	7.3 to 40	7.7 to 8.7	8.2	42.8	87.71	No[10,11]				
Potassium	13/17	316 to 5,000	322 to 4,790	1,600	1,530	NSC	No[12]				
Sodium	17/17	NR	1,500* to 20,400	4,466	4,770	NSC	No[12]				
Vanadium	4/17	1.2 to 50	1.3 to 25.2	7.6	3.8	NSC	Yes	124	15.2	25.2	15.2
Zinc	8/17	1.5 to 20	26.7 to 381	138	200	58.91	Yes	572	69.1	381	69.1

[1] Frequency of detection is the number of samples in which the analyte was detected in relation to the total number of samples analyzed (excluding rejected values).
[2] The value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect value, one-half of the contract required quantification limit/contract required detection limit is used as a surrogate concentration for the sample where nondetect was reported.
[3] The average of detected concentrations is the arithmetic average of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] The background screening concentration is twice the average of detected concentrations for inorganic analytes in background samples.
[5] The ecological screening values are from USEPA Region IV *Supplemental Guidance to RAGS: Ecological Risk Assessment*, (USEPA, 1995c).

Notes continued on next page.

Table 7-4 (Continued)
Selection of Ecological Chemicals of Potential Concern in Unfiltered Groundwater at Site 16

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[6] The 95% upper confidence limit (UCL) is calculated on the log-transformed average of all samples using the formula provided in the USEPA *Supplemental Guidance to RAGS: Calculating the Concentration Term* (USEPA, 1992d). The 95% UCL is not calculated when there are less than 10 total samples.
[7] The average of all samples assigns a value of one-half of the contract required quantification limit/contract required detection limit as a surrogate concentration for samples where nondetect was reported.
[8] The RME concentration is equal to the lesser of the maximum detected concentration or the 95th % UCL.
[9] The CT concentration is equal to the lesser of the average of all samples or the maximum exposure point concentration.
[10] The maximum detected concentration is less than the ecological screening concentration. Therefore, the analyte will not be evaluated further.
[11] The maximum detected concentration is less than the background screening concentration. Therefore, the analyte will not be evaluated further.
[12] Analyte is an essential nutrient and is not considered toxic. Therefore, the analyte will not be evaluated further.

Notes: Samples: 16G00101, 16G00201, 16G00202, 16G00203, 16G00301, 16G00302, 16G00303, 16G00304, 16G00401, 16G00402, 16G00403, 16G00501, 16G00601, 16G00602, 16G00701, 16G00702, and 16G00703.
Duplicate sample: 16G00501D.
Background samples: BKG00101 through BKG00103, BKG00201 through BKG00203, and BKG00301.
Background duplicate sample: BKG00101D.

USEPA = U.S. Environmental Protection Agency.
$\mu g/\ell$ = micrograms per liter.
% = percent.
UCL = upper confidence level; see footnote 6.
RME = reasonable maximum exposure.
CT = central tendency.
NA = not available.
NSC = no screening concentration available.
PCB = polychlorinated biphenyl.
DDT = dichlorodiphenyltrichloroethane.
* = average of sample and duplicate.
ND = not detected in any background sample.

wildlife species (i.e., ingestion dose in milligrams per kilogram per day [mg/kg-day]) depends on a number of factors. A potential dietary exposure (PDE) model is used to estimate exposure to representative wildlife species. The PDE (or body dose) is calculated for each ECPC in surface soil and surface water using the equations presented in Table 7-5 and the methodologies described in the GIR (HLA, 1998).

Wildlife species from different trophic guilds, which may be present at the site, were selected for the PDE model. The model uses species-specific feeding and habitat characteristics to estimate chemical exposures to wildlife species respective to their position in the food chain. Terrestrial receptors were chosen to represent the trophic levels typically found in the planted pine forest habitat present at Site 16. The representative wildlife species considered in the ERA are summarized in Table 7-6 and discussed below.

- **Cotton mouse** (*Peromyscus gossypinus*). The cotton mouse represents a small mammalian herbivore that could potentially be exposed to contamination in soil and in plant tissue (accumulated from the soil). The cotton mouse home range is estimated at 0.147 acre and could reside entirely on the site. The cotton mouse represents the small mammal herbivore community at Site 16.

- **Short-tailed shrew** (*Blarina brevicauda*). The short-tailed shrew finds suitable habitat in forests, fields, marshes, and brush and has a home range of approximately 1 acre. It primarily feeds on earthworms, snails, centipedes, insects, small vertebrates, and slugs (DeGraaf and Rudis, 1986). Insectivorous species may receive relatively high chemical doses of bioaccumulating compounds as a result of their voracious appetites. The shrew represents small omnivorous mammals that may be found in the pine forest of Site 16. An insectivorous bird was selected as a representative species rather than a graminivorous bird because it represents a worse case scenario, as invertebrates tend to bioaccumulate chemicals more readily than plants. As indicated in Table H-1, the invertebrate bioaccumulation factors are an order of magnitude higher than the plant bioaccumulation factors, for the CPCs in surface soil.

- **Eastern meadowlark** (*Sturnella magna*). The eastern meadowlark is most commonly found in open pastures, prairies, farms, and meadows, and has a home range of approximately 5 acres. The meadowlark feeds primarily on invertebrates, although its diet is supplemented with plants. The meadowlark represents insectivorous avian receptors at Site 16. An insectivorous bird was selected as a representative species rather than a graminivorous bird because it represents a worse case scenario, as invertebrates tend to bioaccumulate chemicals more readily than plants. As indicated in Table H-1, the invertebrate bioaccumulation factors are an order of magnitude higher than the plant bioaccumulation factors, for the CPCs in surface soil.

- **Red Fox** (*Vulpes vulpes*). This omnivorous mammal prefers open woodlands and grassy fields and is most active at night and twilight. It is an opportunistic forager, feeding on small mammals, birds, amphibians, reptiles, invertebrates, berries, and other fruits (Burt and

Table 7-5
Estimation of Potential Chemical Exposures for Representative Wildlife Species at Site 16

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Estimation of Chemical Exposures Related to Surface Soil

Scope: Estimates the amount (dose) of a chemical ingested and accumulated by a species via incidental ingestion of surface soil and food items containing site-related chemicals.

Soil Chemical Concentration: The lesser of the maximum detected concentration or the 95th percent upper confidence limit (UCL) of the mean is selected as the reasonable maximum exposure concentration.

Soil Exposure Concentration:

$$\text{Soil Exposure (mg/kg)} = \left(\text{\% of Diet as Soil} \times \text{Soil Concentration (mg/kg)} \right)$$

Primary Prey Item Concentration (T_{N1})

$$\text{Primary Prey Item Concentration (mg/kg)} = \left(BAF_{inv\ or\ plant} \times \text{Soil Concentration (mg/kg)} \right)$$

Secondary Prey Item Concentration (T_{N2}):

$$\text{Secondary Prey Item Concentration (mg/kg)} = \left(BAF_{mam\ or\ bird} \times \text{Tissue Concentration of Primary Prey Items}^{*} \text{(mg/kg)} \right)$$

where BAF = Bioaccumulation Factor or mg/kg fresh weight tissue over mg/kg dry weight soil for invertebrates and plants, and mg/kg fresh weight tissue over mg/kg fresh weight food for small mammals and small birds.

* For a discussion of the weighted chemical concentration in prey items, see explanation of the PDE term below, and the GIR (HLA, 1998)

Total Exposure Related to Surface Soil:

$$\underset{(mg/kgBW\text{-}day)}{PDE} = \frac{[P_1 \times T_1 + \ldots + P_N \times T_N + \text{soil exposure}] \times IR_{Diet} \times SFF \times ED}{BW}$$

where
PDE = potential dietary exposure (mg/kg BW-day),
P_N = percent of diet composed of food item N,
T_N = tissue concentration in food item N (mg/kg),
IR_{Diet} = food ingestion rate of receptor (kg of food or dietary item per day),
BW = body weight (kg) of receptor,
SFF = site foraging frequency (site area [acres] divided by home range [acres]) (SFF cannot be greater than1), and
ED = exposure duration (fraction of year species is expected to occur onsite

See notes at end of table.

Table 7-5 (Continued)
Estimation of Potential Chemical
Exposures for Representative Wildlife Species at Site 16

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Estimation of Chemical Exposures Related to Surface Water

Description:	Estimates the amount of a chemical ingested and accumulated by a species resulting from incidental ingestion of surface water.
Chemical Concentration:	Same procedure as described above for soil .
Surface Water Exposure:	$$\underset{(mg/day)}{\text{Surface Water Exposure}} = \left(\underset{(\ell/day)}{IR_{SW}} \times \underset{(mg/\ell)}{\text{Surface Water Concentration}} \right)$$
	Where IR_{sw} = water ingestion rate of receptors (liters of water per day)

Notes: mg/kg = milligrams per kilogram.
% = percent.
BAF = bioaccumulation factor.
inv = invertebrate species.
mam = mammal species.
BW-day = body weight per day.
kg = kilograms.
mg/day = milligrams per day.
ℓ/day = liters per day.
mg/ℓ = milligrams per liter.

Grossenheider, 1976). The red fox has an estimated home range of approximately 250 acres and represents the large predatory mammal guild at Site 16.

- **Great-horned owl** (*Bubo virginianus*). The great-horned owl is primarily a nocturnal hunter of small mammals. Its habitat includes deep woods and heavily wooded swamps often near open country where it may hunt for primary prey items consisting of small mammals and birds (DeGraaf and Rudis, 1986). The great-horned owl home range is approximately 15 acres. The owl represents the predatory avian carnivores of forested areas of Site 16.

Table 7-6
Ecological Receptors Evaluated For Site 16

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Receptor Evaluated		Method of Evaluation
Common Name	Scientific Name	
Terrestrial Plants	Lettuce seed (*Lactuca sativa*)	Toxicity testing using lettuce seed germination
Terrestrial Invertebrates	Earthworm (*Eisenia foetida*)	Toxicity testing using survival and growth of earthworms
Cotton mouse	*Peromyscus gossypinus*	Food-web model
Short-tailed shrew	*Blarina brevicauda*	Food-web model
Eastern meadowlark	*Sturnella magna*	Food-web model
Red fox	*Vulpes vulpes*	Food-web model
Great-horned owl	*Bubo virginianus*	Food-web model

Parameters for quantitatively evaluating exposures to wildlife include body weight, food ingestion rate, home range, and relative consumption of food items. Exposure assumptions for each of the representative wildlife species for Site 16 are provided in Table 7-7 and Tables H-7 and H-11 of Appendix H. In addition to these parameters, the species foraging habits and bioaccumulation in food items are also considered.

The site foraging frequency (SFF) is an adjustment term that accounts for the frequency a receptor feeds within the site area. The SFF is based on both the acreage of the site relative to the receptor's home range and the fraction of the year the receptor would be exposed to site-related chemicals (i.e., the exposure duration). By definition, the SFF cannot exceed 1. The area of Site 16 (approximately 12 acres) is larger than the home range for the cotton mouse, short-tailed shrew, and eastern meadowlark and smaller than the home range for the red fox and the great-horned owl. Because all representative wildlife species are expected to actively forage at the site year-round, it is assumed that the exposure durations for these organisms are 1.

Wildlife species may be exposed to ECPCs in surface soil via incidental ingestion of soil or by ingesting prey items that have bioaccumulated these ECPCs. To estimate this exposure, a PDE is estimated for all representative wildlife

Table 7-7
Exposure Parameters for Representative Wildlife Species

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Representative Wildlife Species	Body Weight (kg)	Reported Diet	Assumed Diet for Terrestrial Exposure Assessment (% of diet)	Food Ingestion Rate (kg/day)	Water Ingestion Rate (ℓ/day)	Home Range (acres)
Cotton mouse [a] (*Peromyscus gossypinus*)	0.021 [b]	Seeds and some insects. [c]	88% Plants 10% Invertebrates 2% Soil [d]	0.0029 [e]	0.003 [f]	0.147 [g]
Eastern meadowlark (*Sturnella magna*)	0.087 [i]	Insects, weed seeds and grass seeds, 75% of diet is invertebrates (beetles, grubs, bugs, grasshoppers, crickets, ants, and spiders). [i]	75% Invertebrates 20% Plants 5% Soil [i]	0.0119 [l]	0.0115 [k]	5 [i]
Short-tailed shrew (*Blarina brevicauda*)	0.017 [h]	Earthworms, slugs and snails, fungi, insects, and vegetation. [c]	78% Invertebrates 12% Plants 10% Soil [c]	0.0024 [e]	0.0025 [f]	0.96 ± 0.09 [c]
Great-horned owl (*Bubo virginianus*)	1.50 [i]	Mostly rabbits, mice, rats, squirrels, birds. bats, snakes, frog, crayfish and grasshoppers. [i]	80% Small mammals 19% Birds 1% Soil [c]	0.078 [l]	0.077 [k]	15 [m]
Red fox (*Vulpes vulpes*)	4.69 [c]	Small mammals, birds, and invertebrates, as well as berries and other fruits. [c]	57% Small mammals 20% Invertebrates 10% Small birds 10% Plants 3% Soil [c]	0.24 [e]	0.398 [f]	250 [c]

See notes at end of table.

Table 7-7 (Continued)
Exposure Parameters for Representative Wildlife Species

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References:
[a] Values for the deer mouse were used for the cotton mouse (U.S. Environmental Protection Agency [USEPA], 1993b).
[b] Average of adult male and female deer mice in North America (USEPA, 1993b).
[c] Wildlife Exposure Factors Handbook (USEPA, 1993b).
- Invertebrate, plant, and soil values for the short-tailed shrew derived from data presented in Whitaker & Ferraro, 1963.
- Invertebrate, plant, small mammal, small bird and soil values for red fox are averages of values presented in Wildlife Exposure Factors Handbook.
- Small mammal, small bird, and soil values for the owl are averages of the values presented in Wildlife Exposure Factors Handbook.

[d] Deer mouse value used for cotton mouse based on similarities in diet. Plant, invertebrate, and soil values are averages of values presented in the Wildlife Exposure Factors Handbook (USEPA 1993b).
[e] Calculated using the mammal equation based on body weight (Wt.) in kg. Food ingestion (kg/day) = 0.0687 x $Wt^{0.822}$ (kg) (USEPA, 1993b).
[f] Water ingestion rate for mammals is based on body weight in kg: water ingestion (l/day) = 0.099 x $Wt^{0.9}$ (kg) (USEPA, 1993b).
[g] Average for male and female deer mice living in a mixed deciduous forest of Virginia (USEPA, 1993b).
[h] Mean of means reported for male and female shrews in summer and fall (USEPA, 1993b).
[i] Terres (1980).
[j] DeGraaf & Rudis (1986).
[k] Water ingestion rate for birds is based on body weight in kg: water ingestion (l/day) = 0.059 x $Wt^{0.67}$ (kg) (USEPA, 1993b).
[l] Calculated using the bird equation based on body weight (Wt.) in kg. Food ingestion (kg/day) = 0.0582 x $Wt^{0.651}$ (kg) (USEPA, 1993b).
[m] Great-horned owl home range taken from low end of range in SE Madison County, N.Y. (Hager, 1957).

Notes: kg = kilograms.
kg/day = kilograms per day.
ℓ/day = liters per day.
% = percent.
± = plus or minus.

species for each ECPC according to the equations in Table 7-5 and the methodologies described in Subsection 2.4.3 of the GIR (HLA, 1998).

Bioaccumulation factors (BAFs) are used in the wildlife exposure model to estimate the transfer of chemicals in soil to plants or soil invertebrates, and between these organisms and primary consumer species. To estimate the PDE, tissue concentrations of ECPCs in prey items are estimated using BAFs for surface soil. BAFs for most receptors are extrapolated from literature values or estimated using regression equations from scientific liter-literature. Based on the evidence provided in several reference materials (Suter, 1993; Maughan, 1993), an assumption is made that VOCs do not bioaccumulate in prey tissue. The general approach used to select BAFs for Site 16 is summarized in Table 7-8.

BAFs for invertebrate and plant food items are defined as the ratio of the ECPC concentration in plant or invertebrate tissue (mg chemical/kg tissue wet-weight) to the ECPC concentration in surface soil (mg chemical/kg dry-weight soil). BAFs reported in the scientific literature for avian and mammalian receptors are the reported ratios of ECPC concentrations in the tissues of these receptors (mg chemical/kg tissue wet-weight) to the concentrations of ECPCs in their food items (mg chemical/kg tissue wet-weight). BAFs for each of the ECPCs evaluated at Site 16 are included in Table H-1 of Appendix H.

<u>7.4.3 Terrestrial Plants and Invertebrates</u> Terrestrial plants and invertebrates may be exposed to ECPCs via direct contact with and root uptake (plants) or ingestion (invertebrates) of ECPCs measured in Site 16 surface soil and surface water. For the purposes of the quantitative evaluation of soils at Site 16, the primary exposures to terrestrial plants and invertebrates are assumed to occur within the top one-foot interval of surface soil and these data were qualitatively evaluated. Exposure of terrestrial plants and invertebrates is qualitatively evaluated for exposure to subsurface soil as deep rooted and deep burrowing invertebrates may be exposed to this medium. Exposure of terrestrial plants to groundwater is not evaluated because the depth to the water table is approximately 10 to 15 feet bls (see hydrogeological discussion in Section 5.2 of this report).

<u>7.4.4 Aquatic Receptors</u> Exposure concentrations for aquatic receptors in Clear Creek are equal to the RME concentrations of ECPCs detected in groundwater. The focus of the groundwater evaluation is to screen the contaminants detected in groundwater at Site 16, not to estimate actual exposures. The screening evaluation will be used to identify the analytes, detected at concentrations that could potentially pose a risk to aquatic receptors. The results of this screen will be used to identify potentially significant migration pathways to Clear Creek.

<u>7.5 ECOLOGICAL EFFECTS ASSESSMENT</u>. The ecological effects assessment discusses what measurement endpoints were used to evaluate potential adverse impacts to the assessment endpoints (i.e., the maintenance of receptor populations). The methods used for identifying and characterizing ecological effects for ECPCs in surface soil, surface water, and groundwater are described in the following subsections and in greater detail in Subsection 2.4.4 of the GIR (HLA, 1998).

Wildlife receptors, terrestrial plants, and terrestrial invertebrates are potentially exposed to ECPCs in surface soil; terrestrial wildlife is exposed to

Table 7-8
Estimation of Bioaccumulation Factors for Site 16

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Receptor Group	Nature of Approach	General Approach
Terrestrial Plants		
Unit: mg/kg wet tissue per mg/kg dry soil	Literature Values	When available, literature values were used to estimate plant BAFs.
	SAR	When literature values were not available, plant BAFs for semivolatile organic compounds (SVOCs) were calculated using a regression equation based on the relationship between plant bioconcentration factors and the *n*-octanol-water partition coefficient for soil (K_{ow}s) of analytes (Travis and Arms, 1988).[1] The study found that bioconcentration factors for vegetation are inversely proportional to the square root of the K_{ow}s of an analyte.
	Extrapolation and Empirical Data	When literature values were not available, plant BAFs for inorganic compounds were obtained from Baes et al. (1984).[1]
	Assumption	Although evidence suggests that plants may transport organic analytes with log K_{ow}s <5 (i.e., volatile organic compounds [VOCs]) from the roots into leafy portions (Briggs et al., 1982; Briggs et al., 1983), bioaccumulation data for VOCs is generally lacking in the scientific literature. In addition, evidence in the literature (Suter, 1993; Maughan, 1993) suggests that analytes with log K_{ow}s <3.5 are not bioaccumulated into animal tissue. Therefore, it was assumed that transfer of VOCs from plant tissue to animal tissue does not occur.
Terrestrial Invertebrates		
Unit : mg/kg wet tissue per mg/kg dry soil	Literature Values	When no site-specific values were available, literature values were used to estimate BAFs for invertebrates.
	Assumption	Bioaccumulation data for VOCs are generally lacking in the scientific literature. In addition, evidence in the literature (Suter, 1993; Maughan, 1993) suggests that analytes with log K_{ow}s <3.5 are not bioaccumulated into animal tissue. Therefore, it was assumed that soil invertebrates do not bioaccumulate VOCs.
Small Mammals		
Unit : mg/kg wet tissue per mg/kg wet food	Literature Values	When available, literature values were used to estimate BAFs for small mammals.
	SAR	When literature values were not available for SVOCs, BAFs for small mammals were estimated using a regression equation based on the uptake of organic chemicals into beef tissue from Travis and Arms (1988)[3].
	Extrapolation and Empirical Data	When literature values were not available, BAFs for small mammals for inorganics were derived from ingestion-to-beef biotransfer factors (BTFs) presented in Baes et al. (1984)[2].
	Assumption	Bioaccumulation data for VOCs are generally lacking in the scientific literature. In addition, evidence in the literature (Suter, 1993; Maughan, 1993) suggests that analytes with log K_{ow}s < 3.5 are not bioaccumulated into animal tissue. Therefore, it was assumed that small mammals do not bioaccumulate VOCs.

See notes at end of table.

Table 7-8 (Continued)
Estimation of Bioaccumulation Factors For Site 16

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Receptor Group	Nature of Approach	General Approach
<u>Small Birds</u> Unit: mg/kg wet tissue per mg/kg wet food	Literature Values	When available, literature values were used to estimate BAFs for small birds.
	No Information	BAFs were not obtained for SVOCs or for inorganic compounds as there is little bioaccumulation data available for birds. It was assumed that small birds do not accumulate VOCs.

[1] BAFs derived from Baes et al. (1984). Values are based on analysis of literature references, correlations with other chemical and physical parameters, or comparisons of observed and predicted elemental concentrations in vegetative and reproductive plant material and soil. Data are based on dry weight and were converted to a fresh weight basis assuming that plants are 80 percent water. This is generally consistent with the water content of berries (82 to 87 percent water) and leafy vegetables (87 to 95 percent water), presented in Suter (1993). Grains contain a much lower percentage of water (approximately 10 percent); therefore, this assumption likely underestimates exposure to graminivores.
[2] BTFs were converted to a BAF (mg/kg tissue divided by mg/kg food) by multiplying by a food ingestion rate of 12 kg (dry weight) per day (average intake for lactating and nonlactating cattle reported in Travis and Arms, 1988).

Notes: mg/kg = milligrams per kilogram.
BAFs = bioaccumulation factors.
Log K_{ow} = Logarithmic expression of the octanol-water partition coefficient.
< = less than.
kg = kilogram.

ECPCs in the surface water at Site 16; and aquatic receptors are potentially exposed to ECPCs in groundwater that discharge to the surface water of Clear Creek. The measures of adverse ecological effects for these receptors are discussed separately.

7.5.1 Terrestrial Wildlife As identified in the problem formulation, the assessment endpoint selected for terrestrial wildlife is the survival and maintenance of wildlife populations and communities present within the planted pine forest area of Site 16. Because no long-term wildlife population data are available at NAS Whiting Field, a direct measurement of this assessment endpoint is not possible. The literature-derived results of laboratory toxicity studies that relate the dose of a chemical in an oral exposure with an adverse response to growth, reproduction, or survival of a test population (avian or mammalian species) are used as a measure of the assessment endpoint. Wildlife ingestion toxicity data found in the literature are presented in Appendix H, Table H-2 of this report.

Reference toxicity values (RTVs) are derived for each ECPC and representative wildlife species according to the data hierarchy presented in *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim Final* (USEPA, 1997b). The RTV represents the highest exposure level (e.g., concentration in the diet) not shown to produce adverse effects (e.g., reduced growth, impaired reproduction, increased mortality). For each ECPC, two RTVs representing lethal and sublethal effects are selected for each representative wildlife species. Lethal effects are those that result in mortality while sublethal effects include those that impair or prevent reproduction or growth. The RTVs are assumed to be a measure of the assessment endpoints for the protection of the survival, growth, and reproduction of terrestrial wildlife populations. Lethal RTVs are developed using the following data hierarchy discussed in items 1, 2, and 3 (below), while sublethal RTVs are derived using the methodology discussed in items 1 and 2:

1. For contaminants with well-documented adverse effects, the highest reported exposure level not resulting in significant adverse effects (i.e., a no observed adverse effect level (NOAEL)) was selected as the RTV.

2. Generally, one-tenth of the lowest observed adverse effect level (LOAEL) was selected as the RTV for analytes lacking NOAEL values. However, application of the 10-fold uncertainty factor was based on consideration of the exposure duration, type of toxicity test, and the relationship between the selected measurement and assessment endpoints.

3. The lowest reported oral LD_{50} (oral dose [in mg/kg body weight-day] lethal to 50 percent of a test population) was used to derive the lethal RTV if NOAEL or LOAEL values (based on lethal effects) were not available. The lethal RTV is one-fifth of the lowest reported LD_{50} value for the species most closely related to the representative wildlife receptor. One-fifth of an oral LD_{50} value is considered to be protective against lethal effects for 99.9 percent of individuals in a test population (USEPA, 1986). An assumption is made that the value represented by one-fifth of an oral LD_{50} would be protective of 99.9 percent of the individuals within the terrestrial wildlife populations and represents a level of acceptable risk.

A summary of lethal and sublethal RTVs selected from the ingestion toxicity data is provided in Table H-3 of Appendix H.

If neither lethal nor sublethal toxicity information were available for a taxonomic group, no RTVs were identified and risks associated with the respective ECPC were not quantitatively evaluated. However, the absence of specific data for a taxonomic group does not imply that there is no toxicological effect associated with contaminant exposure by these receptors; therefore, potential risks to these taxonomic groups are qualitatively discussed in the Uncertainties Section (Section 7.7).

<u>7.5.2 Terrestrial Plants and Invertebrates</u> The assessment endpoints selected for terrestrial plants and soil invertebrates at Site 16 are survival and growth of these communities. The toxicity of surface soil at Site 16 was measured using two laboratory toxicity tests: a 14-day survival and a 30-day growth test with earthworms (*E. foetida*) and a 120-hour lettuce seed (*L. sativa*) germination test.

Surface soil samples for toxicity testing were collected from six locations at Site 16 (16N00201, 16N00301, 16N00601, 16N00801, 16N01201, and 16N01301 and a duplicate 16N00301D) and two reference soil samples from uncontaminated sites at NAS Whiting Field (BKN00101 and BKN00301 and its duplicate BKN00301D). The Site 16 and reference soil samples were collected concurrently with surface soil samples (16S00201, 16S00301, 16S00601, 16S00801, 16S01201, 16S01301, BKNS00101 and BKNS00301, respectively) for chemical analyses and represent split samples. The results of the chemical analyses can, therefore, be used to establish contaminant exposure concentrations and provide the means to interpret responses in the bioassays. If adverse effects were observed in either of the bioassays, simple linear regressions were completed to determine if a correlation(s) exists between the concentration of an analyte and the adverse response measured in the bioassay.

Appendix F of the GIR (HLA, 1998) presents the results of the toxicity testing of Site 16 surface soil with *E. foetida* and *L. sativa*. A summary of the results from the earthworm survival and growth and lettuce seed germination test performed on Site 16 surface soil is presented in Table 7-9. A summary of toxicity data for plant receptors and terrestrial invertebrates is presented in Appendix H, Summary of Toxicity Data, Table H-4 and H-5.

Because the earthworm survival and lettuce seed germination data in the reference sample, BKN00101, were significantly different ($P \geq 0.05$) than the reference location, BKN00301, and data from sample BKN00301 were not significantly different from the laboratory control, toxicity data from BKN00101 were not included in the statistical comparison of site-related data and control/reference data. Site-related toxicity data were evaluated by a statistical comparison of mean survival, growth (as wet weight), or germination with the reference sample (BKN00301 and BKN00301D) and the laboratory control.

In the six surface soil samples collected from Site 16, survival of *E. foetida* after 14 and 30 days was 100 percent. Growth rates of *E. foetida* in the six surface soil samples from Site 16 were not significantly ($P \geq 0.05$) different from the laboratory control or the reference sample (BKN00301), indicating that the surface soil from Site 16 is not acutely or chronically toxic to invertebrates.

Table 7-9
Summary of Results from Biological Toxicity Testing[1]

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Sample Identification	*Eisenia foetida* Percent Survival After 14 days (30 days)	*Eisenia foetida* Percent Growth After 30 days	*Lactuca sativa* Percent Germination After 120 Hours
16N00201	100(100)	27.6	96
16N00301	100(100)	8.3	91
16N00301D	100(100)	-4.8	89
16N00601	100(100)	12.3	94
16N00801	100(100)	-1.6	97
16N01201	100(100)	2.3	56*
16N01301	100(100)	9.4	92
Lab. Control	100(100)	13	91
BKN00301	100(100)	10.9	97
BKN00301D	100(100)	5	90
BKN00101	100(63)	29.1	43*

[1] The complete biological testing report is presented in Appendix F of General Information Report (Harding Lawson Associates, 1998).

Note: * = Significantly different (probability less than or equal to 0.05)from the laboratory control.

Soil collected from one of the six Site 16 sampling locations inhibited germination of the lettuce seed. Germination potential of lettuce seed, *L. sativa*, in the laboratory control and reference sample (BKN00301) was significantly different ($P \geq 0.05$) from surface soil collected from location 16N01201. Germination in the reference samples was 97 and 90 percent (for samples BKN00301 and BKN00301D, respectively) as compared to 56 percent in sample 16N01201.

7.5.3 Aquatic Receptors. Potential adverse effects associated with Site 16 groundwater ECPCs are available in the form of laboratory aquatic toxicity testing results for individual ECPCs. Aquatic toxicity information for the ECPCs was obtained from searches of the USEPA AQUIRE database (USEPA, 1994d). Information on the AQUIRE database is included in Appendix I. The State of Florida Surface Water Quality Standards (Florida Legislature, 1996) and USEPA Ambient Water Quality Criteria (AWQC); (USEPA, 1988b and 1991c) were also used to assess the potential for adverse effects to aquatic receptors.

7.6 RISK CHARACTERIZATION. This section presents the risk characterization for ecological receptors exposed to affected surface soil, surface water, and groundwater at Site 16. Potential risks associated with exposures to ECPCs in surface soil at Site 16 are discussed separately for wildlife, terrestrial plants, and soil invertebrates. Risks associated with terrestrial wildlife ingestion of surface water ECPCs and aquatic receptor exposures to groundwater ECPCs are also characterized.

Risks to wildlife are characterized by comparing the PDE concentrations for each surface soil and surface water ECPC with its respective RTV (estimated threshold dose for toxicity). Risks to terrestrial plants and soil invertebrates are evaluated based on the results of the respective soil toxicity tests. Risks for aquatic receptors in Clear Creek are evaluated by comparing aquatic toxicity benchmarks to groundwater RME concentrations following application of a 10-fold attenuation factor.

7.6.1 Terrestrial Wildlife Risks for the representative wildlife species associated with ingestion and bioaccumulation of ECPCs in surface soil and prey items were quantitatively evaluated using HQs. HQs are calculated for each ECPC by dividing the PDE concentration by the selected lethal and sublethal RTV. HIs were determined for each receptor by summing the HQs for all ECPCs. When the estimated PDE is less than the RTV (i.e., the HQ < 1), it is assumed that chemical exposures are not associated with adverse effects to receptors and risks to wildlife populations are unlikely to be significant. For instance, if the PDE calculated using the RME concentration is less than the lethal RTV, then it is assumed that adverse effects to the survival of wildlife populations are unlikely to occur. Similarly, if the reasonable maximum PDE is less than the sublethal RTV, then it is assumed that adverse effects to wildlife populations related to growth and reproduction are unlikely to occur. When an HI is greater than 1, a discussion of the ecological significance of the HQs comprising the HI is completed and risks from exposure to CT concentrations of ECPCs are evaluated.

This hazard ranking scheme evaluates potential ecological effects to individual organisms and does not evaluate potential populationwide effects. Contaminants may cause population reductions by affecting birth and mortality rates, immigration, and emigration (USEPA, 1989d). In many circumstances, lethal or sublethal effects may occur to individual organisms with little population-or community-level impacts; however, as the number of individual organisms experiencing toxic effects increases, the probability that population effects will occur also increases. The number of affected individuals in a population presumably increases with increasing HQ or HI values; therefore, the likelihood of population-level effects occurring is generally expected to increase with higher HQ or HI values.

The HQs and HIs based on lethal and sublethal RTVs were calculated for each ECPC and each representative wildlife species. Tables H-8, H-9, H-12, and H-13 of Appendix H present the HQ and HI calculations. A summary of risks to representative wildlife receptors from surface soil ECPCs is provided in Table 7-10. The HIs based on lethal and sublethal RTVs were calculated for each surface water ECPC and each representative wildlife species. Table 7-11 presents the HI calculations.

Lethal effect HIs for representative wildlife species exposed to RME and central tendency concentrations of ECPCs were less than 1; therefore population-level risks are not predicted for these receptors (i.e., bioaccumulating chemicals are not present at sufficiently high enough concentrations to reduce survivability in terrestrial wildlife populations at Site 16).

With the exception of the cotton mouse, sublethal effect HIs for representative wildlife species exposed to RME and CT concentrations of ECPCs were less than 1. Sublethal HIs based on exposure to RME and central tendency concentrations for the white-footed mouse are 5.3 and 2.5 respectively. The primary risk drivers, based on RME concentrations are cadmium and zinc. The primary risk driver, based on central tendency concentrations is cadmium. Based on the results of the food-web model, reductions in the growth and reproduction of small herbivorous mammals are possible at Site 16, but unlikely due to the relatively low HI s (i.e., HI s less than 10).

Summary HIs for representative wildlife species exposed to RME concentrations of surface water ECPCs for lethal and sublethal effects were less than 1; therefore risks are not predicted for these receptors (i.e., ingestion of surface water from the ephemeral wetland at Site 16 is not likely to reduce survivability, growth, and reproduction in terrestrial wildlife populations at Site 16).

<u>7.6.2 Terrestrial Plants</u> Risks for terrestrial plants at Site 16 were evaluated based on the results of soil toxicity tests using lettuce seeds. With the exception of sample 16N01201, germination of the lettuce seed was not inhibited as compared to the reference sample, BKN00301, and the laboratory control. Appendix H presents a series of simple linear regression analyses that evaluate the statistical relationship between biological effects observed in the surface soil bioassays and concentrations of selected analytes in Site 16 surface soil. Although germination of lettuce seeds was slightly inhibited at one of the Site 16 surface soil sampling location, no correlation between germination inhibition and ECPC concentrations was observed (Appendix H). It is possible that reduced germination observed at 16S01201 was either the result of synergistic effects of multiple contaminants or not related to site contamination. Nonmeasured physical, biological, or chemical factors may be responsible for the observed slight reduction in lettuce seed germination (i.e., ECPC exposure concentrations are likely not responsible for the observed effect).

Table 7-10
Summary of Hazard Indices for Terrestrial Wildlife Associated with Exposure to Site 16 Surface Soil[1]

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Ecological Receptors	Lethal Effects from Exposure to Reasonable Maximum EPCs	Lethal Effects from Exposure to Central Tendency EPCs	Sublethal Effects from Exposure to Reasonable Maximum EPCs	Sublethal Effects from Exposure to Central Tendency EPCs
Cotton mouse	0.41	0.21	5.3	2.5
Eastern meadowlark	0.0033	0.0014	0.13	0.069
Short-tailed shrew	0.12	0.061	0.94	0.38
Red fox	0.000078	0.0028	0.0012	0.041
Great-horned owl	0.000044	0.00002	0.014	0.0078

[1] Hazard indices are presented in Tables H-8, H-9, H-12, and H-13.

Note: EPC = exposure point concentration.

Table 7-11
Risks for Representative Wildlife Species from Surface Water ECPCs

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Receptor [a]	Exposure Point Concentration (mg/ℓ) [b]	Water Ingestion Rate (ℓ/day) [a]	Body Weight (kg) [a]	Body Dose [c]	RTVs [d]		HI [e]	
					Lethal	Sublethal	Lethal	Sublethal
				(mg/kgBW-day)				
Aluminum								
Cotton mouse	0.758	0.003	0.021	1.1E-01	7.4E+02	4.3E+02	1.5E-04	2.5E-04
Short-tailed shrew	0.758	0.0025	0.017	1.1E-01	7.4E+02	4.3E+02	1.5E-04	2.6E-04
Eastern meadowlark	0.758	0.0115	0.087	1.0E-01	NA	NA	NC	NC
Red fox	0.758	0.398	4.69	6.4E-02	7.4E+02	4.3E+02	8.7E-05	1.5E-04
Great-horned Owl	0.758	0.077	1.5	3.9E-02	NA	NA	NC	NC
Lead								
Cotton mouse	0.0052	0.003	0.021	7.4E-04	6.0E+01	3.0E+01	1.2E-05	2.5E-05
Short-tailed shrew	0.0052	0.0025	0.017	7.6E-04	6.0E+01	3.0E+01	1.3E-05	2.5E-05
Eastern meadowlark	0.0052	0.0115	0.087	6.9E-04	7.5E+01	4.6E+00	9.2E-06	1.5E-04
Red fox	0.0052	0.398	4.69	4.4E-04	6.0E+01	3.0E+01	7.4E-06	1.5E-05
Great-horned Owl	0.0052	0.077	1.5	2.7E-04	7.5E+01	4.6E+00	3.6E-06	5.8E-05

[a] Exposure parameters including receptors, water ingestion rate, and body weight are presented in Table 7-7.
[b] The surface water exposure point concentrations (EPCs) for aluminum and lead are presented in Table 7-3.
[c] The total body dose is calculated by multiplying the EPC by the water ingestion rate and dividing by body weight.
[d] The RTVs for aluminum and lead are present in Appendix H, Table H-3.
[e] The lethal and sublethal Hazard Indices are calculated by dividing the body dose by the RTV.

Note: NA = not available.

7.6.3 Terrestrial Invertebrates Risks for soil invertebrates at Site 16 were evaluated based on the results of soil toxicity tests using earthworms. After 30 days of exposure to Site 16 surface soil, survival of earthworms in the toxicity test was 100 percent, and percent change in growth was similar (($P \geq 0.05$) to laboratory control and reference sample (BKN00301). The results of the toxicity testing show that surface soil samples collected from Site 16 are not expected to impact the survival and growth of terrestrial invertebrate communities.

7.6.4 Aquatic Receptors The risks associated with ECPCs in groundwater discharged to Clear Creek were evaluated based on comparison of the EPCs in groundwater to reported laboratory toxicity test data (AQUIRE information, USEPA 1994d), Federal AWQC (USEPA, 1988b and 1991c), and State of Florida Surface Water Quality Standards for Class III waters (Florida Legislature, 1996). As previously discussed, EPCs for groundwater are equal to the reasonable maximum exposure point concentrations presented in Table 7-4. Comparison of groundwater EPCs to benchmark values are presented in Table 7-12.

The organic ECPCs in unfiltered groundwater that exceed available screening values include benzene, bis(2-ethylhexyl)phthalate, and 4,4'-DDT. The inorganic ECPCs in unfiltered groundwater that exceed available screening values included aluminum, copper, iron, lead, manganese, and zinc. The results of this screening indicate that there are several analytes detected in groundwater that may pose a potential risk to aquatic receptors. However, further evaluation of the potential and actual risks to aquatic receptors associated with contaminant exposures to Site 16 groundwater will be provided in the ERA for Clear Creek (Site 39).

7.7 UNCERTAINTY ANALYSIS. The objective of the uncertainty analysis is to discuss the assumptions of the ERA process that may influence the risk assessment results and conclusions. Table 2-5 of the GIR presents several general uncertainties inherent in the risk assessment process. (HLA, 1998)

Specific uncertainties associated with exposure to surface soil, surface water, and groundwater at Site 16 include the following:

- Risks to avian species may have been underestimated because bio-accumulation and toxicity data for this taxonomic group are generally lacking in the literature. As a result, potential risks associated with several ECPCs were not evaluated for avian species. If the toxicological and contaminant transport data obtained from studies conducted on mammals were used to estimate risks to avian species, then risk estimates for birds would be higher. However, there is also uncertainty in assuming that the metabolic functions of mammals and birds are similar enough to use inter-taxonomic surrogates.

- The risks to terrestrial wildlife may have been underestimated because the dermal absorption and inhalation pathways were not quantitatively evaluated. Inhalation risks to avian and mammalian species would not likely occur at this site, as this pathway become significant only when there has been an acute exposures (i.e., following a spill or release). Risks to juvenile burrowing/subterranean dwellers may exist as they are in a sensitive lifestage, however fur, feathers, or a chitinous

Table 7-12
Comparison of Site 16 Groundwater ECPC Exposure Concentrations to Toxicity Benchmark Values

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Analyte	RME Exposure Point Concentration (μg/ℓ)[1]	FDEP Class III Fresh Water Quality Standards (μg/ℓ)[2]	AWQC (μg/ℓ)[3]	AQUIRE Lowest Reported Adverse Effect Concentration (μg/ℓ)/Test Species[4]	Result
Volatile Organic Compounds					
Benzene	820	71.28	5,300	3,660/leopard frog LC_{50}	
Trichloroethene	7	[5]80.7	21,900	1,900/medaka LC_{50}	
Xylenes (total)	1	NA	NA	350/scud LC_{50}	
Semivolatile Organic Compounds					
bis(2-Ethylhexyl)phthalate	11.7	3	160	0.89/moorfrog hatchability	Exceeds TBV
Pesticides and PCBs					
4,4'-DDT	0.07	0.001	0.001	0.04/water flea mortality	Exceeds TBV
Inorganic Compounds					
Aluminum	2,165	NA	NA	15/brown trout	Exceeds TBV
Barium	73	NA	NA	68,000/Water flea LC_{50}	
Cobalt	3	NA	NA	[7]11/pikeperch mortality	
Copper	11.9	[8]3.6	[8]3.6	1.5/Water flea reproductive effects	Exceeds TBV
Cyanide	2.3	5.2	5.2	432/Water flea LC_{50}	
Iron	44,802	1,000	1,000	460/brown trout hatchability	Exceeds TBV
Lead	3.2	[8]0.5	[8]0.5	52/rainbow trout mortality	Exceeds TBV
Manganese	1,370	NA	NA	280/phytoplanton species diversity	Exceeds TBV
Vanadium	25.2	NA	NA	128/guppy LC_{50}	
Zinc	381	[8]86	[8]86	17/invertebrate species diversity	Exceeds TBV

See notes at end of table.

Table 7-12 (Continued)
Comparison of Site 16 Groundwater ECPC Exposure Concentrations to Toxicity Benchmark Values

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[1] The exposure point concentration is equal to the RME concentration from Table 7-4.
[2] Chapter 62-302, Surface Water Quality Standards (Florida Legislature, 1996).
[3] Federal Ambient Water Quality Chronic Criteria (USEPA, 1988b and 1991c).
[4] From Appendix I, Table I-1. Only growth, mortality, and reproductive effects to plants, invertebrates, reptiles/amphibians, and fish were considered (USEPA, 1994d).
[5] This standard is based on human health effects.
[6] Value for aluminum as aluminum chloride.
[7] Value for cobalt as cobalt chloride.
[8] The value is based on an assumed site hardness concentration of 25 milligrams/liter (mg/ℓ) as calcium carbonate ($CaCO_3$).

Notes: ECPC = ecological chemical of potential concern.
RME = reasonable maximum exposure.
$\mu g/\ell$ = micrograms per liter.
FDEP = Florida Department of Environmental Protection.
AWQC = Ambient Water Quality Criteria.
AQUIRE = Aquatic Information Retrieval Database.
LC_{50} = lethal concentration to 50 percent of test population.
NA = not available.
TBV = toxicity benchmark value.
PCB = polychlorinated biphenyl.
DDT = dichlorodiphenyltrichloroethane.

exoskeleton are likely to prevent exposure. In any event, risks associated with the ingestion pathway, which was evaluated will far outweigh those other pathways under most circumstances.

- Risks to adult amphibians and reptiles species were not estimated for surface soil ECPCs because bioaccumulation and toxicity data for this taxonomic group are generally lacking in the literature. As a result, potential risks associated with ECPCs are uncertain for these species. However, it is unlikely that these receptors would be adversely affected at this site. For analytes detected in surface soil, the available literature suggests that amphibians are most sensitive to Aroclor and mercury. However, it is unlikely that these contaminants would pose a risk to these receptors at Site 16, as they would be less bioavailable in the surface soil medium, moreover sensitive life stages would not likely be exposed to surface soil. Intertaxonomic surrogates were not used to calculate dietary risks to reptiles and adult amphibian because of the uncertainty associated with extrapolation of data from endothermic to essentially ectothermic species.

- An assumption has been made that organisms evaluated in the surface soil toxicity tests are representative of species at the site. Depending on the sensitivities of terrestrial plants and invertebrates occurring at Site 16, risks may be over- or underestimated.

- Characterization of risks associated with ingestion of surface water by terrestrial wildlife is based on data from one surface water sample collected from the Site 16 ephemeral wetland. Depending on the conditions at the time of sample collection, the surface water data may not be representative of site conditions, and potential risks may be either over- or underestimated.

- The RTVs selected for evaluation of mercury at Site 16 were for organic forms of mercury (e.g., methylmercury). Because available literature indicates that methylmercury is generally more toxic than inorganic forms of mercury, it is likely that the Site 16 ERA overestimates risks from mercury. Although chemical speciation of mercury was not conducted, the available evidence suggests that site conditions are unlikely to result in the conversion of inorganic mercury to methylmercury. Therefore, risks to terrestrial wildlife associated with ingestion of mercury in surface soil may be overestimated.

- BAFs for plant material are based on the assumption that plants are 80 percent water. This assumption applies to berries and leafy vegetables, but does not apply to grains, which have a moisture content of only 10 percent. Since the diet of the cotton mouse consists primarily of grains, the risks to this receptor may be underestimated.

- There is uncertainty associated with the ingestion toxicity data derived from the Registry of Toxic Effects Chemical Substances (RTECS) database. The RTECS data were obtained in 1993, and the primary literature citation was not provided; therefore, the primary literature for these studies were not reviewed. This may have resulted in the selection of RTVs that may overestimate or under-estimate potential risks to wildlife receptors. RTVs for bis(2-ethylhexyl)phthalate, fluoranthene, phenanthrene, pyrene, cadmium, and lead were obtained from RTECS.

- There is uncertainty associated with risks to terrestrial plant and invertebrates from exposure to subsurface soil. Subsurface soil was not quantitatively evaluated in this ERA; however, deep-rooted plants and invertebrates, may have contact with this medium. Therefore, the following qualitative evaluation was conducted in order to evaluate subsurface soil. This evaluation is based on the comparison of analytes detected in subsurface soil with analytes detected in surface soil, ecological toxicity data, and ecological screening values.

- Several VOCs, SVOCs, pesticides and PCBs, and inorganic analytes were detected in subsurface soil. However, nearly all of the analytes in subsurface soil were detected at concentrations that were below the maximum detected concentrations in surface soil and which did not result in toxicity in the site specific assays. All of the pesticides detected in subsurface soil were detected at concentrations that were less than or comparable to concentrations detected in surface soil. The results of this ERA suggest that there would be no impacts to terrestrial invertebrate or plant communities, based on earthworm and lettuce seed germination toxicity tests conducted using site surface soil.

- Three VOCs and two SVOCs were detected in subsurface soil and were not detected in surface soil, however it is unlikely that they would pose a risk to plants or invertebrates due to the low frequency and concentrations detected. The inorganic analytes aluminum, copper, manganese, vanadium, and zinc were detected in subsurface soil at concentrations that exceeded maximum detected concentrations in surface soil and available screening toxicity data for plants and invertebrates. Aluminum and copper, and vanadium and zinc exceeded their respective screening values by three orders of magnitude and two orders of magnitude, respectively. The maximum detected concentration of manganese was six times the ecological screening value. Copper was the only analyte that was detected at a substantially higher concentration in subsurface soil (i.e., 3,620 mg/kg in subsurface soil vs. 202 mg/kg in surface soil). Based on this qualitative evaluation, deep-rooted plants and invertebrates may be at risk from exposure to these inorganic analytes in subsurface soil. However, there is uncertainty associated with applying surface soil benchmarks to this stratum.

<u>7.8 SUMMARY OF ECOLOGICAL ASSESSMENT FOR SITE 16</u>. Potential risks for ecological receptors were evaluated for ECPCs in surface soil, surface water, and groundwater at Site 16.

Risks associated with exposures to ECPCs in Site 16 surface soil and surface water were evaluated for terrestrial wildlife based on a model that estimates the amount of contaminant exposure obtained via the diet and incidental ingestion of surface soil and ingestion of surface water. Wildlife risks were evaluated by comparing the estimated doses for wildlife species (mammals and birds) to a reference toxicity dose representing the threshold at which lethal or sublethal effects may occur. Risks associated with ingestion of surface water by terrestrial wildlife were not identified; therefore, reductions in the survivability, growth, and reproduction of wildlife receptor populations that drink water from the Site 16 ephemeral wetland are not expected to occur. The estimated lethal risks to wildlife receptors from direct and indirect exposure to surface soil and food items were equal to or less than 1 indicating no adverse impacts to the survivability of wildlife populations at Site 16. With the exception of the cotton mouse, sublethal HIs for the representative wildlife species (e.g., red fox, short-tailed shrew, Eastern meadowlark, and the great-horned owl) did not exceed one for both RME and CT exposure concentrations. Ingestion of cadmium, and zinc in surface soil and food items are the primary contributors to the sublethal risks to the cotton mouse. Based on the results of the food-web model, reductions in the growth and reproduction of small herbivorous mammal populations at Site 16 are possible.

Risks to terrestrial plants and soil invertebrates at Site 16 were evaluated based on the results of laboratory toxicity testing, using earthworms (*E. foetida*) and lettuce seeds (*L. sativa*). There was no significant difference in the survival and growth of earthworms as compared to the site background and laboratory control samples. Therefore, reduction in the survival and growth of terrestrial invertebrate communities at Site 16 is not likely. Although a reduction in lettuce seed germination was observed in one surface soil sample (16S01201), there is no apparent correlation between the surface soil ECPC concentrations and the observed response. It is likely that a non-ECPC stressor (i.e., another physical, chemical, or biological stressor) is responsible for germination inhibition at Site 16. Based on the results of the lettuce seed germination toxicity test, reductions in the survival and growth of terrestrial plant communities at Site 16 are not expected. It is unlikely that terrestrial plants or soil invertebrates at Site 16 would be at risk from exposure to VOCs, SVOCs, pesticides and PCBs in subsurface soil, based on the qualitative evaluation of analytes detected in surface soil and available ecological screening toxicity data. However, several inorganic analytes detected in subsurface soil may present a risk to deep-rooted plants and invertebrates at Site 16.

Potential risks for aquatic receptors were evaluated for exposures to ECPCs in groundwater. Comparison of the RME concentrations of each ECPC with available criteria and toxicity benchmarks is the basis of the risk characterization. Several organic and inorganic analytes were detected in groundwater at concentrations that exceeded ecological screening benchmarks. Therefore, the potential for risks to aquatic receptors in Clear Creek associated with exposure to RME concentrations detected in groundwater at Site 16 may exist. However, the ERA for Site 39 will provide additional information regarding potential risks for aquatic receptors in Clear Creek based on actual site-related surface water and sediment data.

This ERA does not follow the step-wise procedure delineated in the *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessment* ("Process Document", 1997) for the selection of ecological contaminants of concern (COC). The procedures outlined in the "Process Document" state that the first-step in the selection of COCs should be a comparison to ecological screening values, prior to using any other screening tool (i.e., FOD, comparison to background, or identification as an essential nutrient). Therefore, the following evaluation was conducted to determine if the conclusions presented in this report would change if the most recent Process Document approach was followed.

In surface soil, Aroclor-1260 and antimony were eliminated from further evaluation, based on FOD and comparison to background, respectively. Several other analytes including calcium, iron, magnesium, potassium, and sodium were eliminated from further evaluation, as they were considered to be essential nutrients. Including these analytes in further evaluation would not have significantly changed the outcome of the ERA, as site specific toxicity testing indicated that the soils are not toxic to plants and invertebrates. In addition, the foodweb modeling showed that similar contaminants that were evaluated did not contribute significantly to the predicted risks at Site 16. In groundwater, the following analytes calcium, magnesium, potassium, and sodium, were eliminated from further evaluation because they are considered essential nutrients. All of the other analytes that were eliminated from further evaluation were eliminated based on comparisons to ecological screening values. Including the essential nutrients in the ERA for further evaluation would not have changed the outcome of this assessment. Surface water was screened using background concentrations only, because the available surface water screening values are protective of aquatic receptors, which are lacking from the habitat where the single surface water sample was collected. The essential nutrients calcium, magnesium, potassium, and sodium detected in surface water were eliminated from further evaluation. The analytes that were eliminated from further evaluation based on comparisons to background included barium, beryllium, iron, manganese, and zinc. Based on the HIs, calculated for the two analytes retained as surface water COCs, it is unlikely that including any or all of the analytes detected in surface water would have changed the conclusions of the ERA.

In summary, the results of the ERA suggest that only sublethal risks (i.e., reductions in growth and reproduction) to small herbivorous mammals are predicted. These risks are likely associated with ingestion of cadmium and zinc in surface soil and food items that have bioaccumulated these inorganic constituents.

8.0 CONTAMINANT FATE AND TRANSPORT

This chapter discusses the fate and transport of human health and ecological chemicals of potential concern (CPCs) detected in soil and groundwater samples at Site 16. Fate, in the context of this chapter, refers to the ultimate disposition of a given CPC following its release into the environment. Transport refers to the mechanism(s) by which a given chemical released into the environment will arrive at its fate. Explanation of the fate and transport of chemicals in the environment can be very complicated or very simple, depending on the physical, chemical, and biological characteristics of the compound or metal considered and the environment into which that compound is released.

Several organic compounds and inorganics were detected in soil and groundwater sampled at Site 16. Because of the number of potential chemicals detected and the myriad fate and transport scenarios possible for those chemicals in the media, this discussion will focus only on those chemicals that may pose adverse risk to human or ecological receptors, as identified by the HHRA (Chapter 6.0) and the ERA (Chapter 7.0) in this report.

The following discussion of contaminant fate and transport is divided into two sections. Section 8.1 discusses potential migration routes of a chemical(s) in the media evaluated and does not focus specifically on media found to be of concern at Site 16. The site-specific persistence, fate, and transport of those compounds and elements found to pose a potential risk to human health or the environment are discussed in Section 8.2.

8.1 POTENTIAL ROUTES OF MIGRATION. Several routes of migration are possible for a contaminant in the various media: air, soil, surface water, groundwater, and biota. These routes are summarized below.

Air. Gases and particulate material can be transported in the atmosphere. Organic compounds, metals, and metal complexes that exist as gases at surface temperature and pressure may disperse or diffuse into the air and particulates may become entrained in air and thereby migrate. The extent to which gaseous constituents and particulate material remain airborne is a function of the level of excitation of the air (wind and temperature) and fate processes acting on the constituent and, for particulates, their density. Particulate material as discussed herein consists of organic compounds and inorganic material that would otherwise not be present in a gaseous medium under atmospheric conditions.

Soil. The primary agents of migration acting on soil include wind, rainwater, running water, biological activity, and human activity. Wind commonly transports soil in the form of particulate material. Rainwater may cause soil to migrate either by washing soil particles downward into the subsurface or by carrying soil particles overland to surface water bodies or other areas of deposition. The amount and type of vegetative cover and surface disturbance affects the degree to which wind and water cause soil to migrate.

Surface Water. The mechanisms for migration of constituents in surface water are dissolution and suspension. Several organic compounds and metals are soluble in water and can be transported in the aqueous phase. Other organic compounds and elements are not soluble in water, but may be transported by surface water via suspension. The amount of suspended particulate material in surface water is largely a function of the water's energy; as that energy decreases, suspended material will settle and become part of the soil or sediment. Colloidal material may remain in suspension (by electrochemical forces) in water of very low energy (e.g., standing water).

Sediment. Saltation, traction, suspension, biological action, and human action are the primary mechanisms of migration for sediment. Physical, chemical, and biological processes affecting a constituent will determine where and how migration from sediment will occur.

Groundwater. Groundwater is a liquid medium capable of transporting constituents as colloidal forms, as complexes, as pure-phase liquids, or as dissolved-phase liquids. Organic compounds and elements generally reach groundwater either by being placed directly into the water table (e.g., disposal pits) or by being leached from soil or solid waste to the water table by physical or chemical processes. Groundwater may discharge to the land surface, surface water bodies, other aquifers, or pumping wells. The migration of constituents from groundwater upon discharge depends on the chemical and/or physical processes acting upon that individual constituent in the medium to which it is discharged.

Biota. Biota may be considered a medium for migration of certain organic compounds and inorganics. Several compounds and elements are known to accumulate in the tissues of organisms at various levels in the food chain. As these organisms are consumed by other organisms, compounds and elements are accumulated in their tissue and passed on to organisms higher in the food chain. In this manner, contaminants may be transported by biota. Additionally, some organisms disturb bed sediments in streams and rivers. This disturbance can cause organic compounds and elements to be transported downstream as suspended material in surface water.

8.2 CONTAMINANT PERSISTENCE AND FATE. The discussion of contaminant persistence and fate in the environment is divided into three subsections. Subsection 8.2.1 discusses the processes that control the persistence and fate of organic compounds and inorganics in the environment. Subsection 8.2.2 discusses the primary persistence and fate characteristics of the constituents detected at Site 16. Subsection 8.2.3 discusses contaminant transport for Site 16.

8.2.1 Processes The persistence and fate of chemical constituents in the environment depends on various chemical, physical, and biological processes. The predominant processes affecting the environmental persistence and fate of chemical constituents include solubility, photolysis, volatilization, hydrolysis, oxidation, chemical speciation, complexion, precipitation or coprecipitation, cationic exchange, sorption, biodegradation or biotransformation, and bioaccumulation. These processes are briefly summarized below.

Solubility. The solubility of chemical constituents in water is important in assessing their mobility in the environment. This is particularly important for the transport and ultimate fate of chemicals from soil and sediment to water (i.e., groundwater and/or surface water). Generally for organic compounds, aqueous solubility is a function of molecular size, molecular polarity, temperature, and the presence of other dissolved organic cosolvents. For metals and other inorganic parameters, solubility is generally controlled by chemical speciation, pH, Eh (redox potential), oxygen content, and the presence of dissolved and/or colloidal organic compounds (e.g., humic and fulvic acids) or other inorganic ion species (e.g., hydroxides and sulfates) (USEPA, 1979). Increased solubility is usually directly related to increased environmental mobility with groundwater and/or surface water being the principal transport medium. Therefore, solubility is a significant factor affecting the fate of a compound or element in the water environment.

<u>Photolysis</u>. Many chemical constituents, particularly organic compounds, are susceptible to photolytic degradation either directly or indirectly. Direct photolysis involves a splitting of the chemical compound by light, whereas indirect photolysis occurs when another compound is transformed by light into a reactive species (i.e., usually an hydroxyl radical) that reacts with and modifies the original compound. In general, photolysis primarily occurs within the atmosphere, although it may also occur to a limited extent in surface water and/or soil under certain environmental conditions (USEPA, 1979).

<u>Volatilization</u>. Volatilization of organic chemicals from soil or water to the atmosphere is an important pathway for chemicals with high vapor pressures. For organic compounds, volatilization is a function of partial pressure gradients, temperature, and molecular size and is more likely to occur for compounds with low molecular weights. In addition, certain metals such as mercury, arsenic, and lead are capable of undergoing biologically mediated transformations (i.e., alkylation) that form volatile end products. Volatilization is important for the transport of certain chemical constituents from surface soil (i.e., vadose zone), sediment, and surface water and is evaluated using Henry's law and other associated chemical-specific rate constants.

<u>Hydrolysis</u>. Hydrolysis involves the decomposition of a chemical compound by its reaction with water. The rate of reaction may be promoted by acid (hydronium ion, $[H_3O^+]$) and/or base (hydroxyl ion, $[OH^-]$) compounds. In general, most organic compounds are resistant to hydrolytic reactions unless they contain a functional group (or groups) capable of reacting with water. Metallic compounds, however, generally dissociate readily in water depending upon the aqueous environmental conditions (e.g., pH and ionic strength). For metals, hydrolytic dissociation is an indirect process that affects the primary fate and transport mechanism of aqueous solubility.

<u>Oxidation</u>. The direct oxidation of organic compounds in natural environmental matrices may occur but this is generally a slow, insignificant transformation mechanism of minimal importance (USEPA, 1979). However, some inorganic compounds may be rapidly oxidized under naturally occurring environmental conditions when the surrounding environment changes from anaerobic to aerobic conditions.

<u>Chemical Speciation</u>. Chemical speciation is important primarily for metals that may exist in multiple forms in the environment, particularly within aqueous matrices. In general, the aqueous speciation of metals depends primarily upon the relative stabilities of individual valence states (which are element-specific), oxygen content, pH and Eh condition, and the presence of available complexating agents and/or other cations and anions (USEPA, 1979). Because various metallic species exhibit differential aqueous solubilities and differential mobilities within soils and/or sediments (USEPA, 1979), the particular speciation of an individual metal will greatly affect its environmental mobility.

Complexation. For metals, complexation with various ligands is an important process because these complexes may be highly soluble in water. Complexation may, therefore, greatly enhance mobility within environmental matrices, particularly in groundwater and surface water, depending upon the aqueous solubility of the resulting complex. Complexation depends upon numerous factors such as pH, Eh, type and concentration of complexing ligands, and other ions present (USEPA, 1979).

Most metals are capable of forming numerous organic and/or inorganic complexes in the natural environment (USEPA, 1979). Metals may form organo-metallic complexes, especially with naturally occurring organic acids (i.e., humic and fulvic acids). In some cases, these metallic species may exhibit varying affinities for different organic ligands (i.e., mercury and arsenic for amino acids and their derivatives) (USEPA, 1979). Metals may also form metallo-inorganic complexes with inorganic ligands such as carbonate, halogens (usually chlorine), hydroxyl, and sulfate (USEPA, 1979). However, organo-metallic complex formation is usually favored over metallo-inorganic complexes.

Precipitation and Coprecipitation. Both chemical precipitation and co-precipitation are important removal mechanisms, particularly for metals and metallo-cyanides in the environment. Precipitation and/or coprecipitation reactions depend on numerous aqueous environmental conditions such as pH, Eh, organic ligands present, oxygen content, and cationic and anionic species present (USEPA, 1979). Depending on the specific conditions, the removal of aqueous metallic species and metallo-cyanides from groundwater and/or surface water can greatly affect a metal's environmental mobility and, hence, its ultimate fate and transport.

Cation Exchange. Cation exchange is important primarily for metals and other ions that may substitute with other cations of similar charge and size within the lattice structure of clay minerals in soil and/or sediment (USEPA, 1979). This process, therefore, can significantly affect the mobility of an aqueous metal cation by removing it from solution under certain environmental conditions.

Sorption. The sorption of chemical constituents by inorganic particulate matter (i.e., soil or sediment) and organic compounds is an important process that affects mobility in the environment. This process is particularly important for the fate and transport of chemicals from soil or sediment to water (i.e., groundwater and surface water). In general, most metals exhibit a potential for adsorption to inorganic particulate matter and organic compounds (USEPA, 1979). Organic compounds also exhibit sorptive capability, but show greater variability in their ability to sorb to particulate or organic matter. The tendency for organic compounds to sorb to soils or sediment is reflected in their organic carbon partitioning coefficients (K_{oc}). K_{oc} is a measure of relative adsorption potential. The normal range of K_{oc} values is from 1 to 10^7 with higher values indicating greater sorption potential. Actual adsorption is chemical-specific and is largely dependent on the organic content of the soil. The fraction of organic carbon, f_{oc}, in soil times the K_{oc} is defined as the distribution coefficient, K_d. The K_d is a ratio of the concentration adsorbed to the concentration partitioned to water.

Regardless of chemical class, sorption is a reversible process whereby desorption can be favored over sorption under certain environmental conditions (e.g., low pH for metals). For organic compounds in general, as the molecular weight increases and the aqueous solubility decreases (i.e., low polarity and high hydrophobicity), the sorptive binding affinity increases (i.e., K_{oc} increases). The tendency for chemical constituents to adsorb to inorganic particulate and/or organic compounds is a particularly important process because sorption to soils and/or sediments can effectively reduce a chemical constituent's mobility.

Biodegradation or Biotransformation. Biodegradation is a result of the enzyme-catalyzed transformation of chemicals. Organisms require energy, carbon, and essential nutrients from the environment for their growth and maintenance. In the process, chemicals from the environment will be transformed by enzymes into a form that can be used by the organism. The biodegradation rate is the rate by which contaminants will be degraded. The rate is a function of microbial biomass and a chemical's concentration under given environmental conditions. When a pollutant is introduced into the environment, there is often a lag time before biodegradation begins while the organism generates an enzyme capable of digesting the chemical. Co-metabolism occurs when a pollutant can be biotransformed only in the presence of another compound that serves as a carbon and energy source (USEPA, 1979).

Bioaccumulation. Bioconcentration and bioaccumulation data are important when evaluating the impact of chemicals in the aquatic environment. The process is characterized by hydrophobic chemicals that can be partitioned into fat and lipid tissues and inorganic chemicals that can be partitioned into bone marrow. The bioconcentration factor is a measure of the concentration of a chemical in tissue (on a dry-weight basis) divided by the concentration in water, and is a commonly used parameter to quantify bioconcentration (USEPA, 1979). The process is significant because bioaccumulation magnifies up through the food chain.

8.2.2 Persistence and Fate of Site 16 CPCs This section discusses the persistence and fate characteristics for CPCs detected at Site 16. To focus the discussion of persistence and fate characteristics, only those constituents that were (1) identified by the human health or ERAs (presented in Chapters 6.0 and 7.0, respectively) as CPCs and (2) those constituents that were present above relevant standards will be addressed. These constituents are summarized below by medium for Site 16.

Human Health Assessment Constituents

- **Surface soil**:
  - VOCs: None.
  - SVOCs: Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene.
  - Pesticides/PCBs: Dieldrin.
  - Inorganics: Aluminum, arsenic, cadmium, iron, lead, and manganese.

- **Groundwater**:
  - VOCs: 1,2-Dichloroethane, 1,2-dichloroethene total, benzene, chloroform, TCE.
  - SVOCs: Bis(2-ethylhexyl)phthalate.
  - Pesticides/PCBs: 4,4'-DDT.
  - Inorganics: Aluminum, arsenic, barium, cadmium, iron, and manganese.

Ecological Assessment Constituents

- **Surface soil:**
  VOCs: None.
  SVOCs: Carbazole, bis(2-ethylhexyl)phthalate, benzo(a) anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo-(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)-anthracene, fluoranthene, indeno (1,2,3-cd) pyrene, phenanthrene, and pyrene.
  Pesticides/PCBs: Aroclor-1254.
  Inorganics: Aluminum, barium, cadmium, copper, lead, manganese, mercury, silver, vanadium, and zinc.

- **Surface Water:**
  VOCs: None.
  SVOCs: None.
  Pesticides/PCBs: None.
  Inorganics: Aluminum, barium, beryllium, iron, lead, manganese, and zinc.

- **Groundwater:**
  VOCs: Benzene, TCE, and xylenes.
  SVOCs: Bis(2-ethylhexyl)phthalate.
  Pesticides/PCBs: 4,4'-DDT.
  Inorganics: Aluminum, barium, cobalt, copper, cyanide, iron, lead, manganese, vanadium, and zinc.

The fate and persistence characteristics of these constituents are summarized below by analytical fraction.

VOCs

Benzene. Benzene (C_6H_6) may enter the environment as result of the production, storage, transport, venting, and combustion of gasoline, as well as the production, transport and storage of benzene as a pure product. Benzene is also natural by-product of forest fires (Howard, 1990).

Benzene is highly volatile, and is highly mobile in soil. If released to the soil, benzene will evaporate or leach from the soil to the groundwater. Biodegradation of benzene is likely in shallow aerobic waters, though not under anaerobic conditions. Abiotic degradation is largely limited to benzene present in the atmosphere. Hydrolysis is an insignificant mechanism for the breakdown of benzene (Howard, 1990).

1,2-Dichloroethane. 1,2-Dichloroethane (1,2-DCA) is used primarily as an industrial solvent, scouring compound, wetting, and penetrating agent. It is used in a wide variety of applications such as fumigant for grain, rubber goods fabrication, degreasing, and metal cleaning.

1,2-DCA has a moderately high vapor pressure, which allows small releases to the ground to evaporate relatively rapidly. In the atmosphere, 1,2-DCA degrades to hydroxyl radicals rapidly with a half-life of just over a month. 1,2-DCA volatilizes rapidly from surface water with a typical half-life of 10 days. The half-life in a stream would be much shorter with no adsorption to stream or river sediments. Biodegradation and hydrolysis are slow (USEPA, 1979).

1,2-Dichloroethene. Dichloroethene (1,2-DCE) ($C_2H_2CL_2$) exists as two isomers, *cis* and *trans*. The *trans* isomer is twice as toxic as the *cis* isomer. Both may enter the environment in emissions and wastewater and as a solvent and extractant in the production of perfumes, lacquers, and thermoplastics. In addition, 1,2-DCE is a breakdown product in the reductive dehalogenation of TCE and tetrachloroethene (PCE) (Howard, 1990).

When released to soil, 1,2-DCE will either evaporate or leach to the groundwater. Adsorption to soil and sediment particles is low and biodegradation in soil and groundwater is slow. The greatest removal mechanism of 1,2-DCE from soils and waters is through volatilization (Howard, 1990).

Chloroform. Chloroform has been widely used in refrigerants, solvents, adhesives, dry-cleaning spot removers, fire extinguisher, in manufacturing of dyes and pesticides, and as a fumigant. Chloroform was previously used as an anesthetic (Agency for Toxic Substances and Disease Registry [ATSDR], 1991a).

Most chloroform released into the environment will eventually end up in the atmosphere, and a much smaller amount will enter the groundwater. Chloroform in the atmosphere is degraded by indirect photochemical reactions (ATSDR, 1991a).

Chloroform is released to soil by improperly disposed of wastes. It can be released to water during manufacture; however, most releases to groundwater at sites occur by leaching. Chloroform will readily leach from soil into the groundwater because of low soil adsorption and significant water solubility (ATSDR, 1991a).

Chemical hydrolysis and biodegradation are not a significant removal process in soil or water. Chloroform is expected to persist for a long time in groundwater (ATSDR, 1991a).

Trichloroethene. TCE is used as an industrial solvent particularly in metal degreasing. It is also used in a wide variety of other applications such as dry cleaning, as a fumigant, as a diluent in paints and adhesives, and in textile processing (Howard, 1990).

TCE has a relatively high vapor pressure of 58.7 millimeter of mercury (mm Hg) at 25 °C and would be expected to volatilize rapidly from surface soils. TCE has a relatively small sorption value of 125 K_{oc}, indicating that it would not sorb strongly to organic material in soil. TCE is soluble in water (1,100 milligrams per liter (mg/ℓ) at 25°C, (USEPA, 1986b) and would be carried by infiltrating rainwater to groundwater where migration with groundwater will occur.

Xylenes. Xylenes are chemicals primarily man-made from petroleum or coal. Xylene is a colorless liquid with a sweet odor that evaporates and burns easily. Xylene does not mix well with water, but does mix well with alcohol and other chemicals. Xylene has three isomers: meta-xylene, ortho-xylene, and para-xylene, (respectively m-, o-, and p-xylene), which, when mixed together, are termed xylenes.

Xylene is used as a solvent in the printing, rubber, cleaning, and leather industries, and as a thinner for paints. Xylene is found in gasoline and airplane fuel and is used as a material/ingredient in the manufacture of some plastics.

Xylenes when spilled on land either volatilize or leach into the ground. Sorption is an important factor in soils with high organic matter or high carbon content. Xylene are relatively mobile in soil with low carbon content and may leach into groundwater depending on soil conditions. Xylenes in groundwater are known to persist for several years (ATSDR, 1993a).

PAHs. A total of thirteen PAHs was identified as CPCs (benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, carbazole, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene) at Site 16. PAHs are a group of chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances. PAHs can either be man-made or occur naturally. A few of the PAHs are used in medicines and to make dyes, plastics, and pesticides, while others are contained in asphalt used in road construction. There are more than 100 different PAH compounds (ATSDR, 1993a).

In air, PAHs are found sorbed to particulates and as gases. Particle-bound PAHs can be transported long distances and are removed from the atmosphere through precipitation and dry deposition. PAHs are transported in surface waters by volatilization and sorption to settling particles. The compounds are transformed in surface waters by photooxidation, chemical oxidation, and microbial metabolism. Sorption of PAHs to soil and sediment increases with increasing organic content and is also directly dependant upon particle size. Microbial metabolism is the major process for degradation of PAHs in soil environments. PAHs have relatively low solubilities, but if transported through soils by either leaching or colloidal movement, PAHs can enter groundwater and be transported within an aquifer (ATSDR, 1993a).

Pesticides/PCBs

Dieldrin. The pesticides aldrin and dieldrin were used, from the 1950s until the early 1970s, as insecticides on crops such as corn and cotton. The USDA canceled all uses of aldrin and dieldrin in 1970. However, aldrin and dieldrin were approved for killing termites by the USEPA in 1972. Use of aldrin and dieldrin to control termites continued until 1987. Aldrin is readily converted to dieldrin, which is ubiquitous in the environment (ASTDR, 1991b).

Dieldrin is persistent in the environment because it is more resistant to biotransformation and abiotic degradation than aldrin; as a result, dieldrin is found in low levels in all media, even at a distance from the site of concentration. Transport of dieldrin in soils is minimal because it tends to bind tightly to soil; however, it can volatilize from soil. Most dieldrin found in surface water is the result of runoff from contaminated soil. The resistance of dieldrin to soil leaching generally precludes its migration into groundwater (ASTDR, 1991b).

4,4'-DDT. 4,4'-DDT and its primary metabolites, 4,4'-DDE and 4,4'-DDD, are man-made chemicals and are not known to occur naturally in the environment. Most releases of the chemicals are related to their manufacture and use as insecticides in agriculture and vector control. Pesticidal use of DDT, except in public health emergency, was banned in the United States in 1972. Due to the extensive past use of DDT worldwide and the persistence of DDT and its metabolites, these materials are virtually ubiquitous and are continually being transformed and redistributed in the environment (ATSDR, 1992).

DDT, DDE, and DDD are only slightly soluble in water. Therefore, they are not easily displaced from their site of application, nor do they tend to leach to groundwater. Appreciable amounts of the compounds may remain in the soil for extended periods of time and are only readily moved by physical erosion of soil particles (ATSDR, 1992).

Four mechanisms have been identified as accounting for the most losses of DDT residues from soils: volatilization, removal by harvest of organic matter, water runoff, and chemical transformation. Photooxidation of DDT is known to occur on soil surfaces; however, it is not known to hydrolyze. Biodegradation may occur under both aerobic and anaerobic conditions in the presence of certain soil microorganisms (ASTDR, 1992).

Aroclor-1254. Available empirical data suggest that PCBs, especially those with four or more chlorines, are persistent in the environment (ATDSR, 1992). Aroclor-1254 is a high molecular weight PCB (325 grams per mole [g/mole]) with a very low solubility. As a result, the fate and persistence of this PCB tends to bind to soil and eventually biodegrade over several years (USEPA, 1979).

Inorganics

Aluminum. Aluminum is the third most common element in the environment, though not generally found in elevated concentrations in groundwater. Aluminum is known to complex readily, however, and high concentrations present in groundwater are generally due to silt-sized particles of aluminum-containing compounds often present as clays or aluminum hydroxides. Complexing and polymerization of the most common valence state of aluminum, Al^{+3}, represents the predominant transport mechanism for aluminum in the environment.

Arsenic. Arsenic has two stable forms in solution in groundwater, arsenate (As^{5+}) and arsenite (As^{3+}). In groundwater with Ph ranging from 3 to 7, the monovalent arsenate anion $H_2AsO_4^-$ is the dominant form. Upon entering surface water, via groundwater discharge, arsenic may partition to sediment from solution by hydrous iron oxide adsorption and/or coprecipitation (or a combination of both) with sulfides in the sediment. The Eh and Ph conditions of the surface water and sediment govern the effectiveness of these mechanisms (adsorption and coprecipitation) as a sink for arsenic. These mechanisms appear to be the major inorganic factors controlling arsenic concentrations in surface water (Hem, 1992).

Arsenic may be very mobile in the aquatic environment, cycling through the water column, sediment, biota, and air. Most arsenic released into the environment (on the earth's surface) eventually ends up either in sediments (in stream beds or lakes) or in the oceans. Eh and Ph conditions largely govern the fate of arsenic (USEPA, 1979).

Barium. The concentration of dissolved barium in water is usually controlled by the solubility of the barium sulfate barite (BaS04), whose solubility product is approximately 10E-10. For a dissolved sulfate concentration of 1 mg/ℓ, the expected dissolved barium concentration would be approximately 1.4 mg/ℓ. Barium may also adsorb to metal oxide or hydroxide coating on aquifer solid media.

Beryllium. Beryllium has a very low solubility and is probably adsorbed onto soils as rainwater moves downward through the vadose zone. Complexing agents may solubilize beryllium, but water quality data suggest that the concentration of this metal in heavily polluted water is low. Beryllium is generally found in the environment in particulate rather than dissolved form (USEPA, 1979). Though little information is available regarding the bioaccumulation of beryllium, studies have shown the beryllium does bioaccumulate at relatively low rates (USEPA, 1979).

Cadmium. Cadmium is persistent in the environment as an ore or mineral. Cadmium is not readily soluble in water, but soluble in acids and alkalies. Cadmium released into the environment from the Earth's surface eventually ends up in either sediments (in stream beds or lakes) or in the oceans. Eh and pH conditions largely govern the fate of cadmium (USEPA, 1979).

Cobalt. Cobalt is a relatively rare element, ranking 30th in abundance in the earths crust. Cobalt exist as a mixture of two allotropes with the β form predominating below 400 C, and the α form predominating above that temperature. Cobalt has two oxidation states, besides the environmental form: +2 is the most important oxidation state and +3, which is a strong oxidizing agent. Cobalt forms oxides, nitrates, and ammines, as well as chloride, sulfate, and acetate (Hem, 1992).

Aqueous species of Co^3+ do not appear to be thermodynamically stable under Eh and Ph conditions that normally occur in natural waters (Hem, 1992). Co^2+ compounds are moderately soluble in groundwater or surface water and are expected to migrate with the water.

Cyanide. Cyanides are any of the compounds that include the group $-(CN)^-$. The cyanide ion (CN^-) can react with a variety of metals to form insoluble metal cyanides. If the ion is present in excess, in an environment with transitional metals, complex metallocyanides may form, which are soluble and may be transported in solution.

Cyanide is typically used in the form of hydrogen cyanide, a highly toxic gas, to manufacture acrylonitrile, acrylates, adiponitrile, cyanide salts, dyes, chelates, rodenticides, and pesticides. Metal cyanides are soluble and are used extensively in electroplating.

Simple metal cyanide complexes are sorbed by sediments while more complex metal cyanide complexes are highly soluble in water; however, adsorption does not appear to be important in controlling the mobility of cyanides in soil or water. Metal cyanide salts are not volatile. Bioaccumulation of metal cyanide complexes occurs but the toxic effects limit the amount of accumulation (USEPA, 1979).

Iron. Iron is the second most abundant element in the environment though dissolved concentrations present in groundwater are generally low. The chemical behavior of iron and its solubility depend upon the oxidation intensity and pH of the environmental system in which it is found. Iron exists in two valence states, Fe^{2+} and Fe^{3+}, with the Fe^{2+} or ferrous form the most common form of iron found in solution in the reducing conditions within the groundwater environment. Dissolved iron generally sorbs to sediment and may precipitate as iron hydroxide or may oxidize to form iron oxides and iron oxyhydroxides (USEPA, 1979). Iron also may complex with organic molecules, especially fulvic and humic acids. Aerated or flowing water with a pH in the range of 6.5 to 8.5 should contain little dissolved iron.

Lead. The accumulation of lead in most soils is primarily a function of the rate of deposition from the atmosphere. Most lead is retained strongly in soil, and very little is transported into surface water or groundwater. The fate of lead in soil is affected by the specific or exchange adsorption at mineral interfaces, the precipitation of sparingly soluble solid phases, and the formation of relatively stable organic-metal complexes or chelates with soil organic matter. These processes are dependant on such factors as soil pH, organic content of soil, the presence of inorganic colloids and iron oxides, ion-exchange characteristics, and the amount of lead in soil (ASTDR, 1988a).

The chemistry of lead in aqueous solutions is highly complex because this element can be found in a many forms. Lead has a tendency to form compounds of low solubility with major anions of natural water. In the natural environment, the divalent form (Pb^{2+}) is the stable ionic species of lead. Hydroxide, carbonate, sulfide, and, more rarely, sulfate may act as solubility controls in precipitating lead from water. The amount of lead that remains in the solution depends upon the pH of the water and the dissolved salt content (ASTDR, 1988a).

Manganese. Manganese is a naturally occurring element found in soil, lakes, streams, and food. Manganese does not occur in the environment as a pure metal, but is found combined with other chemicals like oxygen, sulfur, and chlorine. Elemental manganese and inorganic manganese compounds have negligible vapor pressures, but exist in air as suspended particulate matter derived from industrial emissions or the erosion of soils. Manganese is often transported in rivers as suspended sediment. The metal may exist in any of four oxidation states (2+, 3+, 4+, or 7+). Mn+2 is the most common form found in water with a pH between 4 and 7, but manganese may oxidize at a pH greater than 8. The transportation of manganese in water is controlled by the solubility of the specific chemical form present and the characteristics of available anions (ATSDR, 1990a).

Mercury. Mercury is an element that occurs naturally in the environment, typically at very low levels. In the elemental form mercury is a shiny, silver-white odorless liquid with a metallic taste. Mercury in combination with carbon-containing compounds is called "organic mercury"; if no carbon is present, the compound is called "inorganic mercury". All compounds of mercury are considered poisonous.

Mercury has three valence states that are dependant on a number of factors, including redox potential and pH of the medium. In soil and surface water, mercury can exist in the mercuric (Hg^{+2}) and mercurous (Hg^{+1}) states as a number of complex ions with varying water solubilities.

Mercury released to the environment is typically very stable and lingers for a long time, possibly changing from the organic to the inorganic form and vice versa. Mercury released to the environment by human activity is typically higher than is naturally found. Mercury released to surface soil remains in the soil for a long time and seldom migrates through soil to groundwater.

Silver. The major source of elevated silver levels in cultivated soils is from the application of sewage sludge and sludge effluents as agricultural amendments. Additional anthropogenic sources of silver in soil include atmospheric deposition and landfilling of household refuse or industrial wastes (ASTDR, 1989).

The mobility of silver in soils is affected by drainage (silver tends to be removed from well-drained soils), oxidation-reduction potential and pH conditions, and the presence of organic matter (which complexes with silver and reduces its mobility). Silver tends to form complexes with inorganic chemicals and humic substances in soils. Silver is toxic to soil microorganisms and inhibits bacterial biodegrative enzymes; therefore, biotransformation is not expected to be a significant process in the transformation and degradation of silver (ASTDR, 1989).

Vanadium. Vanadium commonly exists in the V^{3+}, V^{4+}, and V^{5+} valence states. Its aqueous chemistry is quite complex, but overall concentrations seem to be controlled more by availability of a vanadium source, rather than equilibrium considerations. Bioconcentration of vanadium by vegetation has been reported by several researchers.

Zinc. Zinc is a natural element found in soil. Zinc is also deposited in soils by atmospheric deposition. It is released to the atmosphere as dust and fumes from zinc production facilities, lead smelters, brass works, automobile emissions, fuel combustion, incineration, and soil erosion. Zinc occurs in the environment in the +2 oxidation state. The relative mobility of zinc in soil is determined by the solubility of the compound, soil type, and pH and salinity of the soil (ASTDR, 1988b).

8.2.3 Transport of Contaminants This section discusses the transport of chemicals in various media at Site 16. All media, surface soil, subsurface soil, surface water, sediment, and groundwater will be discussed.

Surface Soil. Transport of the CPCs in soil is dependent on several factors, as discussed in Section 8.1. The primary agents of migration acting on soil include wind, water, and human activity. Soil can also act as a source medium from which the CPCs are transported to other media. Transport of the CPCs from soil via wind is not expected to be a major transport mechanism because of the heavy vegetation present at Site 16. Vegetative cover is an effective means of limiting wind erosion of soil. Humans are effective at moving soil and can greatly affect the transport of soil-bound chemicals at hazardous waste sites. Under the current use of Site 16, human activity is not a major transport mechanism for the CPCs in soils. This condition may change based on the future use of Site 16.

Water can cause the transport of soil and, therefore, the CPCs in soil, via the mechanisms of physical transport of soil or the leaching of constituents from the soil to groundwater. Soil erosion, the physical transport of soil via surface water runoff, is currently not considered a major mechanism for the transport of the CPCs in soil at Site 16 because of (1) the low grade (slope) of the land surface at the site, (2) the heavy vegetation at the site, and (3) the nature of the constituents remaining in the soil at the site.

During the period of reported active disposal at Site 16, from 1943 to 1965, the potential for physical transport of both soil and CPCs via runoff could have been a potentially significant mechanism for transport. If pits were excavated into the soil and waste materials were dumped into the pits, heavy precipitation events could have easily moved the unvegetated soil around the pits. Additionally, the possibility exists that the pits overflowed during heavy rain storms because they were not covered during their operation. The pits are presumed to be backfilled following their periods of use, and the area revegetated. No significant transport of surface soil is expected since revegation of the Site 16 area.

The majority of the analytes detected in the soil at Site 16 are likely to remain attached to the soil because most metal analytes adsorb readily to or are natural constituents of clays and other minerals.

Surface Water. There are no permanent surface water bodies associated with Site 16. Transport of the waterborne CPCs from Site 16 may occur during heavy rain events as surface runoff. Surface water runoff is directed west (approximately 500 feet) toward Clear Creek. Water infiltration directly into the soil is presumed to occur during all but the heaviest rain events.

Currently, transport of the CPCs at Site 16 via runoff is not considered an important transport mechanism because of (1) the low slope of the land surface at the site, (2) high infiltration capacity of soil at the site, (3) the heavy vegetation at Site 16, and (4) the tendency of the surface soil contaminants at the sites to remain attached to clays in the soil.

When Site 16 was an active disposal area, transport of the CPCs via surface water runoff may have been a more significant means of contaminant transport. If disposal pits were open to rainfall during their operation, it is possible that intense precipitation could have caused the pits (if they existed) to overflow. Transport of the CPCs via surface water runoff is not considered important now that the site is vegetated.

Sediment. The transport of sediment at Site 16 by the action of humans is not currently a significant transport mechanism because very little human activity occurs in the drainage ditch. Saltation, traction, and suspension are possible means of sediment transport in water at Site 16 during heavy rain events.

Normally there is no over-land flow off the site. During heavy rain events, sediment may become suspended in surface water runoff. It is believed that the sediment would not remain in suspension long enough to reach the tributary of Clear Creek because most of the surface water would infiltrate rapidly into the ground.

Groundwater. As discussed in Section 5.5, the observed concentrations of the inorganics in unfiltered groundwater at Site 16 was affected by turbidity in the groundwater samples at the time of collection. The groundwater samples collected in 1996 (during Phase IIB) are thought to be more representative of groundwater conditions at the site. It is probable that particulate material of larger than colloidal size does not easily move through the matrix of the aquifer. Colloid-sized material may be transported through the aquifer matrix at flow rates present in the surficial aquifer system at Site 16.

Hydrogeology at Site 16 is discussed in Section 5.2 of this report. The aquifer present at the site is the surficial (sand and gravel) aquifer. The CPCs identified for groundwater are associated with the surficial aquifer system. Recharge of the surficial aquifer at Site 16 occurs primarily by rainfall on the site and in the area north of the site. Groundwater flow direction in the surficial aquifer at Site 16 is primarily to the south-southwest. Clear Creek acts as a point of discharge approximately 400 feet west to southwest of the site.

Hydraulic data from well clusters completed at Site 16 indicate that the vertical gradient in this area is downward. The upper (approximately) 100 feet of material is sand with varying amounts of silt and clay and likely acts as a single hydraulic unit.

It is important to note that the presence of upward or downward vertical hydraulic gradients does not mean that flow is actually occurring, only that flow, if it were to occur, would be in a horizontal direction with an upward or downward component. Lithologies present at a site, such as clay or clayey sands, may retard the vertical flow. Vertical hydraulic gradients should be viewed as indicative of a potential, not necessarily as an actual, transport route.

Horizontal hydraulic gradient estimates have been developed for the combined Site 15 and 16 area. The gradient was calculated for the periods of January 1997 and August 1997 and averaged (Table 5-2). The average hydraulic gradient in the surficial aquifer is 0.0067 and 0.0064 ft/ft respectively in a south-southwest direction.

Hydraulic conductivity testing was completed on six monitoring wells at Site 16. The average hydraulic conductivity value for the site is 0.0154 feet per minute or 22.2 ft/day (Table 5-4).

Horizontal groundwater seepage velocity calculations have been completed for the surficial aquifer system at Site 16 using available hydraulic information (Section 5.2). A seepage velocity of 139 ft/yr was calculated using the average hydraulic conductivity from eight monitoring wells at Site 16 (0.38 ft/day), an average horizontal gradient of 0.0067 ft/ft for these monitoring wells, and an estimated effective porosity of 0.35. Disposal activities at Site 16 may have begun releasing contaminants to the aquifer approximately 50 years ago. Using the seepage velocity calculated above and a 50-year time frame, the total distance of potential contaminant migration was estimated to be approximately 3,100 feet.

The calculated estimate of 3,100 feet of migration relies on hydraulic conductivity values derived from slug test data. Slug tests provide a rough estimate of hydraulic conductivity that can be more accurately measured using pumping tests. Slug data may differ by up to a factor of 10 (Bouwer and Rice, 1989). If the hydraulic conductivity value used in the calculation were decreased by an order of magnitude, a total migration of only 310 feet would be expected for the 50-year history of the site.

Clear Creek is the final point of discharge for groundwater from the surficial aquifer at Site 16. Clear Creek is located approximately 400 feet southwest of Site 16. Surface water and sediment samples collected during Phase I of the RI from sampling locations located upstream and downstream of the expected groundwater discharge points from Site 16 do not conclusively support any impact to surface water quality of Clear Creek from past Site 16 activities (ABB-ES, 1992b). The results of surface water and sediment sampling are presented in Technical Memorandum No. 4, Surface Water and Sediments (ABB-ES, 1992b) and will also be presented in the concurrent RI report for Site 39, Clear Creek Floodplain.

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 CONCLUSIONS. The following conclusions are based on the RI at Site 16, Open Disposal and Burning Area at NAS Whiting Field:

- Geophysical survey results suggested the presence of two separate large areas of geophysical anomalies indicating general disposal areas rather than trenched fill areas. Smaller geophysical anomalies present east of the site are interpreted to represent random disposal areas rather than points of controlled fill.

- Ten test pits were excavated at the locations of geophysical anomalies at Site 16. Materials encountered during test pit excavations include construction debris, metallic debris, and aircraft parts.

- Methane and VOCs were detected during the soil gas survey conducted at Site 16. The highest soil gas concentrations (exceeding 5,000 parts per million [ppm] methane) were reported near the northeastern boundary of the southern landfill boundary.

- Two VOCs, 14 SVOCs, 6 pesticides, and 2 PCB compounds were detected in 30 Site 16 surface soil samples. No VOCs were detected in surface soils that exceeded regulatory limits.

- The SVOCs benzo(g,h,i)perylene and dibenzo(a,h)anthracene exceeded the residential USEPA Region III RBCs. Two SVOCs, benzo(a)pyrene and benzo-(g,h,i)perylene, exceeded the industrial cleanup target levels for Florida. Benzo(a)pyrene and dibenzo(a,h)anthracene exceeded the industrial Region III RBCs. Benzo(a)pyrene and benzo(b)fluoranthene exceed the USEPA Region III RBCs and Florida residential cleanup goals for surface soil.

- Dieldrin was detected in two samples at concentrations exceeding the residential SCTL for Florida and the USEPA Region III RBC. No other pesticides or PCBs were detected at concentrations that exceeded either Florida or Federal SCTLs.

- Twenty-three inorganic analytes and cyanide were detected in the 30 surface soil samples. Eighteen inorganic analytes exceeded the background screening values for surface soil. Beryllium, iron, and lead exceeded the Florida residential SCTLs. Arsenic and beryllium exceeded the residential USEPA Region III RBCs. Arsenic also exceeded the USEPA Region III industrial RBCs.

- Seven VOCs, 11 SVOCs, and 4 pesticides compounds were detected in the five Site 16 subsurface soil samples. None of the detected concentrations of VOCs, SVOCs, or pesticides exceeded the USEPA Region III RBCs for industrial-use soils.

- Twenty inorganic analytes were detected in the five subsurface soil samples. Eight analytes (calcium, chromium, iron, manganese, potassium, vanadium, zinc, and cyanide) were detected at concentrations exceeding the background screening values. None of these inorganics exceeded industrial standards for either the Florida SCTLs or USEPA Region III RBCs.

- Arsenic was detected in all five subsurface soil samples at concentrations ranging from 1.5 to 15.1 mg/kg. Three of the five environmental samples and the duplicate sample exceeded the industrial SCTL for Florida (3.7 mg/kg) and the USEPA Region III RBC (3.8 mg/kg).

- Lead was detected in all five subsurface soil samples at concentrations ranging from 6.8 to 766 mg/kg. Lead concentrations exceeded the industrial values of the USEPA Region III RBC (400 mg/kg) in two samples.

- The pH values of the groundwater samples collected from monitoring wells were below the lower range for the Federal and State secondary MCL of 6.5 SUs but were within the range of pH values observed in background groundwater samples collected at NAS Whiting Field.

- No VOCs, SVOCs, pesticides, or PCBs were detected in the surface water sample collected at Site 16. Eleven inorganic analytes were detected in the surface water sample, but only aluminum exceeded the Florida Class III fresh surface water value. Aluminum was detected at a concentration (758 $\mu g/\ell$) that exceeded the Florida groundwater guidance concentration of 200 $\mu g/\ell$.

- No VOCs were detected in the groundwater samples collected from the shallow monitoring wells at Site 16 nor were VOCs detected in background groundwater samples. One SVOC, bis(2-ethylhexyl)phthalate) was detected in groundwater samples collected from the shallow monitoring wells at concentrations below the Federal MCL and Florida groundwater guidance concentrations of 4.8 and 6 $\mu g/\ell$, respectively, for bis(2-ethylhexyl)phthalate. Bis(2-ethylhexyl)phthalate was not detected in background groundwater samples. One pesticide (4,4'-DDT) was detected in a shallow groundwater monitoring well at a concentration of 0.15 $\mu g/\ell$, which exceeded the Florida groundwater guidance concentration of 0.1 $\mu g/\ell$. No PCB compounds were detected in any shallow Phase IIB groundwater samples.

- Twenty analytes (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, zinc and cyanide) were detected in shallow groundwater samples collected from Site 16. Thirteen inorganic analytes (aluminum, barium, cadmium, calcium, copper, iron, magnesium, manganese, potassium, sodium, vanadium, zinc, and cyanide) were detected at concentrations exceeding the background screening concentrations. Six inorganic analytes (aluminum, antimony, beryllium, cadmium, iron, and manganese) were detected at concentrations exceeding either Federal or State regulatory limits.

- Eight VOCs (1,2-dichloroethane, 1,2-dichloroethene [total], benzene, chloroform, ethylbenzene, toluene, TCE, and xylenes [total]) were detected in the groundwater samples collected from the intermediate monitoring wells at Site 16. 1,2-Dichloroethane, 1,2-dichloroethene, benzene, TCE, and xylenes were detected at concentrations that either equaled or exceeded the Florida groundwater guidance concentrations.

- Three SVOCs (naphthalene, phenol, and bis(2-ethylhexyl)phthalate) were detected in the groundwater samples collected from the intermediate monitoring wells at Site 16. None of the detected SVOCs were found in background groundwater samples. Bis(2-ethylhexyl)phthalate was detected at a concentration equal to the Federal MCL of 6 $\mu g/\ell$ and exceeding the Florida groundwater guidance concentration of 4.8 $\mu g/\ell$ for bis(2-ethylhexyl)phthalate.

- One pesticide (4,4'-DDT) detected at a concentration of 0.14 $\mu g/\ell$ exceeded the Florida groundwater guidance concentration of 0.1 $\mu g/\ell$. No PCB compounds were detected in any Phase IIB intermediate depth groundwater samples.

- Fourteen inorganic analytes were detected in intermediate groundwater samples collected from Site 16. Seven inorganic analytes (barium, calcium, iron, magnesium, manganese, sodium, and zinc) were detected at concentrations exceeding the background screening concentrations. Four inorganic analytes (aluminum, antimony, iron, and manganese) were detected at concentrations exceeding either Federal or State regulatory limits.

- Five VOCs (1,2-dichloroethane, 1,2-dichloroethene [total], benzene, toluene, and TCE) were detected in the groundwater samples collected from monitoring wells screened in the deeper level at Site 16. 1,2-Dichloroethane, 1,2-dichloroethene, benzene, and TCE were detected at concentrations exceeding the Federal MCLs. 1,2-Dichloroethane and benzene were detected at concentrations exceeding the Florida groundwater guidance concentrations.

- Three SVOCs (naphthalene, phenol, and bis(2-ethylhexyl)phthalate) were detected in groundwater samples collected from monitoring wells screened in the deep surficial aquifer at Site 16. None of the detected SVOCs were found in background groundwater samples. Only bis(2-ethylhexyl)phthalate was detected at concentrations exceeding both the Federal MCL and the Florida groundwater guidance concentration.

- No pesticides or PCB compounds were detected in any groundwater samples collected from monitoring wells screened in the deeper level of the surficial water table.

- Fifteen inorganic analytes were detected in deep groundwater samples collected from Site 16. Seven inorganic analytes (aluminum, copper, iron, lead, manganese, potassium, and sodium) were detected at concentrations exceeding the background screening concentrations. Three inorganic analytes (aluminum, iron, and manganese) were detected at concentrations exceeding either Federal or State regulatory limits.

- The groundwater flow direction is toward the southwest and likely discharges to Clear Creek. Clear Creek is located approximately 400 feet west-southwest of the site. The average horizontal hydraulic gradient for the site is 0.0066 ft/ft. The geometric mean for the hydraulic conductivity data for monitoring wells in the site area is 22.2 ft/day and the average seepage velocity value is 0.38 ft/day.

- The human health risk assessment identified eight PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene), one pesticide (dieldrin) and ten inorganic analytes (aluminum, barium, arsenic, cadmium, chromium, copper, iron, lead, manganese, and vanadium) as HHCPCs for surface soil at Site 16. Three inorganic analytes (arsenic, iron, and lead) were identified as HHCPCs for subsurface soil at Site 16. Five VOCs (1,2-dichloroethane, 1,2-dichloroethene [total], benzene, chloroform, and TCE); one SVOC (bis(2ethylhexyl)phthalate), one pesticide (4,4'-DDT), and six inorganics (aluminum, arsenic, barium, cadmium, iron, and manganese) were identified as HHCPCs for groundwater in Site 16.

- The total ELCR at Site 16 associated with ingestion of soil by a hypothetical future resident, current and hypothetical future trespasser, and hypothetical future occupational worker exceeded Florida's target risk level of concern (1×10^{-6}) due primarily to carcinogenic PAHs and arsenic. The background levels of arsenic at Site 16 exceed the Florida residential SCTL and may result in an unacceptable carcinogenic risk. It is likely that naturally occurring arsenic contributes to the FDEP target risk-level exceedance.

- Noncancer risk levels for soil, subsurface soil, and surface water meet the USEPA and FDEP target HI of one.

- The surface water ELCR for hypothetical future residents exceeds Florida's target level of concern due to beryllium. It should be noted, however, that this ELCR is based only on one sample.

- The ELCR for groundwater associated with residential ingestion and inhalation of volatiles while showering exceeded the Florida target level of concern due primarily to VOCs (primarily benzene) and arsenic; however, groundwater contamination is being addressed as a separate RI site under a facilitywide investigation.

- The central tendency risks from surface soil and surface water to a hypothetical current and future trespasser and a hypothetical future occupational worker (soil only) met the Florida level of concern (1×10^{-6}) for Site 16. Central tendency residential risks remain slightly above the FDEP target levels. The hypothetical future residential groundwater risks (carcinogenic and noncarcinogenic) remain above the FDEP target risk levels, but provide the risk managers and decision makers with a perspective of the hypothetical risk range to future residents.

- The ecological risk assessment selection of ECPCs for the surface soil samples collected at Site 16 include 13 SVOCs (carbazole, bis(2-ethylhexyl)phthalate, benzo(a)anthracene, benzo(a)pyrene, benzo(b)-fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno (1,2,3-cd) pyrene, phenanthrene, and pyrene), 1 PCB (Aroclor-1254), 1 pesticide (dieldrin), and

10 inorganic constituents (aluminum, barium, cadmium, copper, lead, manganese, mercury, silver, vanadium, and zinc).

- ECPCs selected for the surface water sample collected from the ephemeral wetland at Site 16 include seven inorganic analytes (aluminum, barium, beryllium, iron, lead, manganese, and zinc).

- Risks were identified for terrestrial wildlife resulting from exposure to ECPCs in surface soil; therefore, reductions in the survivability, growth, and reproduction of wildlife receptor populations at Site 16 may occur.

- ECPCs selected for the unfiltered groundwater samples collected at Site 16 include three VOCs (benzene, TCE, and xylenes), one SVOC (bis(2-ethylhexyl)phthalate), one pesticide (4,4'-DDT), and ten inorganics (aluminum, barium, cobalt, copper, cyanide, iron, lead, manganese, vanadium, and zinc).

- Reduction in terrestrial plant and soil invertebrate biomass used as forage material was evaluated by comparing exposure concentrations for surface soil with toxicity benchmarks. Based on this comparison it is unlikely that plant and invertebrate biomass or plant cover availability would be reduced such that small mammal and bird populations at Site 16 would be affected.

- Potential risks for aquatic receptors were evaluated for exposures to ECPCs in groundwater. The concentrations of ECPCs in groundwater as they discharge to Clear Creek 450 feet downgradient of Site 16 were estimated based on application of a 10-fold attenuation factor to the RME concentration. Based on the screening evaluation of groundwater, risks to aquatic receptors in Clear Creek associated with exposure to groundwater ECPCs from Site 16 are not expected. The ERA for Site 39 will provide additional information regarding potential risks for aquatic receptors in Clear Creek based on actual site-related surface water and sediment data.

- In summary, the results of the ERA suggest that only sublethal risks (i.e., reductions in growth and reproduction) to small mammal and bird and predatory bird populations are predicted. These risks are likely associated with ingestion of cadmium, lead, and zinc in surface soil and food items that have bioaccumulated these inorganic constituents.

9.2 RECOMMENDATIONS. Based upon the interpretation of findings from the RI activities, a FS is recommended for Site 16 to evaluate potential strategies for the reduction in human health and ecological risks associated with surface soil at the site. In addition, the presence of organic and inorganic analytes in Site 16 groundwater samples at concentrations exceeding Florida's target risk levels indicates that additional sampling and remedial measures may be required. However, all groundwater contamination issues will be addressed as part of the RI for the facilitywide groundwater study to be completed in the future.

10.0 PROFESSIONAL REVIEW CERTIFICATION

The work and professional opinions rendered in this report were conducted and developed in accordance with commonly accepted procedures and protocols consistent with applied standards of practice. This report is based on the geologic investigation and associated information detailed in the text and appended to this report. If conditions are discovered or determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of any additional information on the assessment described in this report. The RI for Site 16, Open Disposal and Burning Area, was developed for NAS Whiting Field in Milton, Florida, and should not be construed to apply for any other purpose of or to any other site.

Eric A. Blomberg
Professional Geologist
P.G. No. 1695

1-17-00
Date

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APPENDIX A

QUALITY CONTROL PARCCs REPORT

LABORATORY DATA CONSULTANTS, INC.
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APPENDIX A

Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida
PARCC Summary Tables

Draft Version

08/30/96

APPENDIX A

Table of Contents

Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG#: WF016 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1876A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
BKB00101	RB583001		soil	5-20-96	X	X	X	X	X
BKB00102	RB583002		soil	5-20-96	X	X	X	X	X
BKB00401	RB583003	FD	soil	5-20-96	X	X	X	X	X
BKB00401D	RB583004	FD	soil	5-20-96	X	X	X	X	X
BKB00402	RB583005		soil	5-20-96	X	X	X	X	X
BKB00201	RB583006		soil	5-20-96	X	X	X	X	X
BKB00202	RB583007		soil	5-20-96	X	X	X	X	X
BKR00201	RB583008	R	water	5-20-96	X	X	X	X	X
BKF00101	RB583009	SB	water	5-20-96	X	X	X	X	X
BKT00201	RB583010	TB	water	5-20-96	X				
BKB00301	RB583011		soil	5-21-96	X	X	X	X	X
BKB00302	RB583012		soil	5-21-96	X	X	X	X	X
BKB00501	RB583013		soil	5-21-96	X	X	X	X	X
BKB00502	RB583014		soil	5-21-96	X	X	X	X	X
BKB00601	RB583015		soil	5-21-96	X	X	X	X	X
BKB00602	RB583016	FD	soil	5-21-96	X	X	X	X	X
BKB00602D	RB583017	FD	soil	5-21-96	X	X	X	X	X
BKB00701	RB583018		soil	5-21-96	X	X	X	X	X
BKB00702	RB583019		soil	5-21-96	X	X	X	X	X
BKB00401MS	RB583003MS	MS	soil	5-20-96	X	X	X	X	X
BKB00401MSD	RB583003MSD	MSD	soil	5-20-96	X	X	X	X	X
BKR00201MS	RB583008MS	MS	water	5-20-96				X	
BKR00201MSD	RB583008MSD	MSD	water	5-20-96				X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF016					VALIDATION SAMPLE TABLE				LDC#: 1876A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/PCBs**	**Metals**	**Cyanide**
BKF00101MS	RB583009MS	MS	water	5-20-96					X
BKF00101MSD	RB583009MSD	MSD	water	5-20-96					X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF017 **VALIDATION SAMPLE TABLE** **LDC#: 1876B**

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#: 8532-20**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
31B00601	RB592001	FD	soil	5-21-96	X	X	X	X	X
31B00602	RB592002		soil	5-21-96	X	X	X	X	X
31B00603	RB592003		soil	5-21-96	X	X	X	X	X
31B00604	RB592004		soil	5-21-96	X	X	X	X	X
31B00605	RB592005		soil	5-21-96	X	X	X	X	X
31B00601D	RB592006	FD	soil	5-21-96	X	X	X	X	X
12B00101	RB592007	FD	soil	5-21-96	X	X	X	X	X
12B00101D	RB592008	FD	soil	5-21-96	X	X	X	X	X
12B00102	RB592009		soil	5-21-96	X	X	X	X	X
31B00701	RB592010		soil	5-22-96	X	X	X	X	X
31B00702	RB592011		soil	5-22-96	X	X	X	X	X
31B00703	RB592012		soil	5-22-96	X	X	X	X	X
31B00704	RB592013		soil	5-22-96	X	X	X	X	X
31B00705	RB592014		soil	5-22-96	X	X	X	X	X
31B00801	RB592015		soil	5-22-96	X	X	X	X	X
31B00801DL	RB592015DL		soil	5-22-96	X				
31B00802	RB592016		soil	5-22-96	X	X	X	X	X
31B00803	RB592017		soil	5-22-96	X	X	X	X	X
31B00803DL	RB592017DL		soil	5-22-96	X				
31B00804	RB592018		soil	5-22-96	X	X	X	X	X
31B00804DL	RB592018DL		soil	5-22-96	X				
31B00805	RB592019		soil	5-22-96	X	X	X	X	X
31R00101	RB592020	R	water	5-22-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF017					VALIDATION SAMPLE TABLE				LDC#: 1876B
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#: 8532-20**
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/PCBs**	**Metals**	**Cyanide**
31T00301	RB592021	TB	water	5-22-96	X				
12R00101	RB592022	R	water	5-21-96	X	X	X	X	X
BKT00301	RB592023	TB	water	5-21-96	X				
31B00601MS	RB592001MS	MS	soil	5-21-96	X	X	X	X	X
31B00601MSD	RB592001MSD	MSD	soil	5-21-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF018					VALIDATION SAMPLE TABLE		LDC#: 1876C
Project Name: NAS Whiting Field					Parameters/Analytical Method		**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Lead only**
30B00201	RB602001		soil	5-23-96	X	X	X
30B00202	RB602002	FD	soil	5-23-96	X	X	X
30B00203	RB602003		soil	5-23-96	X	X	X
30B00202D	RB602005	FD	soil	5-23-96	X	X	X
30B00101	RB602006		soil	5-23-96	X	X	X
30B00102	RB602007		soil	5-23-96	X	X	X
30B00103	RB602008		soil	5-23-96	X	X	X
30R00101	RB602010	R	water	5-23-96	X	X	X
30T00101	RB602011	TB	water	5-23-96	X		
30B00202MS	RB602002MS	MS	soil	5-23-96	X	X	X
30B00202MSD	RB602002MSD	MSD	soil	5-23-96	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF019 **VALIDATION SAMPLE TABLE** **LDC#: 1876D**

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#: 8532-20**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Lead only
30B00501	MB047001		soil	6-4-96	X	X	X
30B00502	MB047002	FD	soil	6-4-96	X	X	X
30B00503	MB047003		soil	6-4-96	X	X	X
30B00502D	MB047005	FD	soil	6-4-96	X	X	X
30B00401	MB047006		soil	6-4-96	X	X	X
30B00402	MB047007		soil	6-4-96	X	X	X
30B00403	MB047008		soil	6-4-96	X	X	X
30R00201	MB047010	R	water	6-4-96	X	X	X
30T00201	MB047011	TB	water	6-4-96	X		
30R00301	MB068001	R	water	6-5-96	X	X	X
30T00301	MB068002	TB	water	6-5-96	X		
30F00101	MB068003	SB	water	6-5-96	X	X	X
30B00601	MB068004		water	6-5-96	X	X	X
30B00602	MB068005	FD	soil	6-5-96	X	X	X
30B00603	MB068006		soil	6-5-96	X	X	X
30B00602D	MB068009	FD	soil	6-5-96	X	X	X
30B00301	MB068010		soil	6-5-96	X	X	X
30B00302	MB068011		soil	6-5-96	X	X	X
30B00303	MB068012		soil	6-5-96	X	X	X
30B00303DL	MB068012DL		soil	6-5-96		X	
30B00305	MB068015		soil	6-5-96	X	X	X
30B00502MS	MB047002MS	MS	soil	6-4-96	X	X	X
30B00502MSD	MB047002MSD	MSD	soil	6-4-96	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF019 **VALIDATION SAMPLE TABLE** **LDC#: 1876D**

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#: 8532-20**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Lead only
30F00101MS	MB068003MS	MS	soil	6-4-96			X
30F00101MSD	MB068003MSD	MSD	soil	6-4-96			X
30B00601MS	MB068004MS	MS	water	6-5-96			X
30B00601MSD	MB068004MSD	MSD	water	6-5-96			X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF020 | **VALIDATION SAMPLE TABLE** | **LDC#: 1883A**

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#: 8532-20**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Lead only
33B00301	MB080001		soil	6-6-96	X	X	X
33B00302	MB080002	FD	soil	6-6-96	X	X	X
33B00303	MB080003		soil	6-6-96	X	X	X
33B00304	MB080004		soil	6-6-96	X	X	X
33B00305	MB080005		soil	6-6-96	X	X	X
33B00305RE	MB080005RE		soil	6-6-96		X	
33B00306	MB080006		soil	6-6-96			X
33B00302D	MB080007	FD	soil	6-6-96	X	X	X
33B00201	MB080008		soil	6-6-96	X	X	X
33B00202	MB080009		soil	6-6-96	X	X	X
33B00203	MB080010		soil	6-6-96	X	X	X
33B00205	MB080011		soil	6-6-96			X
33B00101	MB080012		soil	6-6-96	X	X	X
33B00102	MB080013	FD	soil	6-6-96	X	X	X
33B00103	MB080014		soil	6-6-96	X	X	X
33B00102D	MB080015	FD	soil	6-6-96	X	X	X
33R00101	MB080016	R	water	6-6-96	X	X	X
33T00101	MB080017	TB	water	6-6-96	X		
33B00302MS	MB080002MS	MS	soil	6-6-96	X	X	
33B00302MSD	MB080002MSD	MSD	soil	6-6-96	X	X	
33B00302MSRE	MB080002MSRE	MS	soil	6-6-96		X	
33B00302MSDRE	MB080002MSDRE	MSD	soil	6-6-96		X	
33B00302S	MB080002S	MS	soil	6-6-96			X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF020					VALIDATION SAMPLE TABLE		LDC#: 1883A
Project Name: NAS Whiting Field					Parameters/Analytical Method		**Job#: 8532-20**
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Lead only**
33B00302D	MB080002D	DUP	soil	6-6-96			X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Ta..e 1

SDG#: WHF021	VALIDATION SAMPLE TABLE	LDC#: 1883B
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	TCLP Metals
30U00101	MB107001		soil	6-11-96	X
30U00201	MB107002		soil	6-11-96	X
30U00301	MB107003		soil	6-11-96	X
30U00401	MB107004		soil	6-11-96	X
33U00101	MB107005		soil	6-11-96	X
33U00201	MB107006		soil	6-11-96	X
33U00301	MB107007		soil	6-11-96	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table II
Summary of Rejected Data (Organics)
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	**Fraction**	**Sample**	**Compound**	**Reason**
WF016	Volatiles Semivolatiles Pesticides & PCBS	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF017	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF018	Volatiles Semivolatiles	All samples All samples	No rejected results No rejected results	- -
WF019	Volatiles Semivolatiles	All samples All samples	No rejected results No rejected results	- -
WF020	Volatiles Semivolatiles	All samples All samples	No rejected results No rejected results	- -

Table III
Summary of Rejected Data (Inorganics)
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes				
SDG	**Fraction**	**Sample**	**Analyte**	**Reason**
WF016	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF017	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF018	Lead	All samples	No rejected results	-
WF019	Lead	All samples	No rejected results	-

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds								
			Criteria		% Recovery			
SDG	Client ID	Compound	% Recovery	RPD	MS	MSD	RPD	Qualifier
WF016	BKB00401	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		Pesticides/PCBs	-	-	-	-	-	None
WF017	31B00601	Volatiles	-	-	-	-	-	None
		N-Nitroso-di-n-propylamine	41-126	≤38	33	-	45	None
		1,2,4-Trichlorobenzene	38-107	≤23	33	-	43	None
		Phenol	-	≤35	-	-	40	None
		1,4-Dichlorobenzene	-	≤27	-	-	44	None
		4-*Chloro-3-methylphenol*	-	≤33	-	-	38	None
		Acenaphthene	-	≤19	-	-	30	None
		Pesticides/PCBs	-	-	-	-	-	None
WF018	30B00203	Volatiles	-	-	-	-	-	None
		N-Nitroso-di-n-propylamine	41-126	-	33	34	-	UJ
		1,2,4-Trichlorobenzene	38-107	-	35	35	-	UJ
		Pyrene	35-142	-	33	-	-	UJ
WF019	30B00502	Volatiles	-	-	-	-	-	None
		1,4-Dichlorobenzene	-	≤27	-	-	40	UJ
		1,2,4-Trichlorobenzene	-	≤23	-	-	34	UJ
		Acenaphthene	-	≤19	-	-	25	UJ
WF020	33B00302	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF016	**Client ID**	**BKB00401**	**BKB00401D**	
	Laboratory ID	**RB583003**	**RB583004**	
	Collection Date	**5/20/96**	**5/20/96**	
	Acetone	6 ug/Kg	17 ug/Kg	96
	Di-n-butylphthalate	1000 ug/Kg	970 ug/Kg	3
	Pesticides/PBs	ND	ND	-
WF016	**Client ID**	**BKB00602**	**BKB00602D**	
	Laboratory ID	**RB583016**	**RB583017**	
	Collection Date	**5/21/96**	**5/21/96**	
	Acetone	47 ug/Kg	6 ug/Kg	155
	Di-n-butylphthalate	580 ug/Kg	310 ug/Kg	61
	Pesticides/PCBs	ND	ND	-
WF017	**Client ID**	**31B00601**	**31B00601D**	
	Laboratory ID	**RB592001**	**RB592006**	
	Collection Date	**5/21/96**	**5/21/96**	
	Acetone	3 ug/Kg	11 ug/Kg	114
	Di-n-butylphthalate	39 ug/Kg	350U ug/Kg	Not calculable
	Bis(2-ethylhexyl)phthalate	110 ug/Kg	79 ug/Kg	33
	Gamma-chlordane	1.5 ug/Kg	1.1 ug/Kg	31
WF017	**Client ID**	**12B00101**	**12B00101D**	
	Laboratory ID	**RB592007**	**RB592008**	
	Collection Date	**5/21/96**	**5/21/96**	
	Acetone	8 ug/Kg	3 ug/Kg	91
	Diethylphthalate	830 ug/Kg	370U ug/Kg	Not calculable
	Pesticides/PCBs	ND	ND	-
WF018	**Client ID**	**30B00202**	**30B00202D**	
	Laboratory ID	**RB602002**	**RB602005**	
	Collection Date	**5/23/96**	**5/23/96**	
	Acetone	7 ug/Kg	9 ug/Kg	25
	Methylene chloride	1 ug/Kg	2 ug/Kg	67
	Di-n-butylphthalate	380U ug/Kg	360 ug/Kg	Not calculable
WF019	**Client ID**	**30B00502**	**30B00502D**	
	Laboratory ID	**MB047002**	**MB047005**	
	Collection Date	**6/4/96**	**6/4/96**	
	Acetone	16 ug/Kg	14 ug/Kg	13
	Methylene chloride	2 ug/Kg	2 ug/Kg	0
	Trichloroethene	ND	1 ug/Kg	Not calculable
	Bis(2-ethylhexyl)phthalate	1000 ug/Kg	970 ug/Kg	3
	2-Methylnaphthalene	1900U ug/Kg	210 ug/Kg	Not calculable

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF019	**Client ID**	**30B00602**	**30B00602D**	
	Laboratory ID	**MB068005**	**MB068009**	
	Collection Date	**6/5/96**	**6/5/96**	
	Acetone	23 ug/Kg	31 ug/Kg	30
	Methylene chloride	5 ug/Kg	4 ug/Kg	22
	Trichloroethene	ND	1	Not calculable
	Di-n-butylphthalate	51 ug/Kg	43 ug/Kg	17
	Bis(2-ethylhexyl)phthalate	99 ug/Kg	42 ug/Kg	81
WF020	**Client ID**	**33B00302**	**33B00302D**	
	Laboratory ID	**MB080002**	**MB08007**	
	Collection Date	**6/6/96**	**6/6/96**	
	Acetone	7 ug/Kg	8 ug/Kg	13
	Methylene chloride	ND	2 ug/Kg	Not calculable
	1,2-Dichloroethene (total)	ND	4 ug/Kg	Not calculable
	Trichloroethene	ND	13 ug/Kg	Not calculable
	Bis(2-ethylhexyl)phthalate	48 ug/Kg	380U ug/Kg	Not calculable
WF020	**Client ID**	**33B00102**	**33B00102D**	
	Laboratory ID	**MB080013**	**MB080015**	
	Collection Date	**6/6/96**	**6/6/96**	
	Acetone	5 ug/Kg	5 ug/Kg	0
	Methylene chloride	ND	1 ug/Kg	Not calculable
	Di-n-butylphthalate	66 ug/Kg	45 ug/Kg	21
	Bis(2-ethylhexyl)phthalate	760 ug/Kg	370U ug/Kg	Not calculable

Table VI
Summary of Surrogate Recoveries
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF016	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
	All samples	Pesticides/PCBs	All within QC limits	-	-	None
WF017	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			6	
	12R00101	Decachlorobiphenyl	57	60-150		UJ (all detects)
		Decachlorobiphenyl	56	60-150		UJ (all detects)
	31R00101	Decachlorobiphenyl	27	60-150		UJ (all detects)
		Decachlorobiphenyl	27	60-150		UJ (all detects)
	12B00101D	Tetrachloro-m-xylene	58	60-150		UJ (all detects)
	12B00102	Tetrachloro-m-xylene	55	60-150		UJ (all detects)
		Tetrachloro-m-xylene	56	60-150		UJ (all detects)
	31B00603	Tetrachloro-m-xylene	46	60-150		UJ (all detects)
		Decachlorobiphenyl	54	60-150		UJ (all detects)
		Tetrachloro-m-xylene	49	60-150		UJ (all detects)
		Decachlorobiphenyl	53	60-150		UJ (all detects)
	31B00604	Tetrachloro-m-xylene	52	60-150		UJ (all detects)
		Decachlorobiphenyl	58	60-150		UJ (all detects)
		Tetrachloro-m-xylene	54	60-150		UJ (all detects)
WF018	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
WF019	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
WF020	All samples	Volatiles	All within QC limits	-	-	None
	33B00305	Semivolatiles			1	
		2-Fluorophenol	0	25-121		R (all compounds)
		Phenol-d5	0	24-113		R (all compounds)
		2-Chlorophenol-d4	0	20-130		R (all compounds)
		1,2-Dichlorobenzene-d4	0	20-130		R (all compounds)
		Nitrobenzene-d5	0	23-120		R (all compounds)
		2-Fluorobiphenyl	0	30-115		R (all compounds)
		2,4,6-Tribromophenol	0	19-122		R (all compounds)
		Terphenyl-d14	0	18-137		R (all compounds)

Notes: J = estimated value
UJ = undetected, but number that is reported as the quantification limit is an estimated value.

Table VII
Summary of Compounds Exceeding Instrument Calibration
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF016	5/31/96	Chloromethane	48.8	26.5	UJ
	6/1/96	Chloromethane	42.0	-	UJ
	6/2/96	Chloromethane	-	37.6	UJ
	6/3/96	Chloromethane	-	33.4	UJ
	6/6/96	4-Nitroaniline	-	29.2	UJ
		Di-n-octylphthalate	-	25.2	UJ
	6/12/96	Endrin aldehyde	21.4	-	J
WF017	5/31/96	Chloromethane	48.8	26.5	UJ
	6/1/96	Chloromethane	42.0	-	UJ
	6/2/96	Chloromethane	-	37.6	UJ
	6/3/96	Chloromethane	-	33.4	UJ
	6/4/96	Chloromethane	-	64.3	UJ
		Chloroethane	-	37.9	UJ
	6/4/96	Chloromethane	-	62.2	UJ
	6/6/96	4-Nitroaniline	-	29.2	UJ
		Di-n-octylphthalate	-	25.2	UJ
	6/7/96	Butylbenzylphthalate	-	26.8	UJ
		3,3'-Dichlorobenzidine	-	32.9	UJ
		Bis(2-ethylhexyl)phthalate	-	27.4	UJ
	6/12/96	Endrin aldehyde	21.4	-	J
WF018	5/31/96	Chloromethane	48.8	26.5	UJ
	6/1/96	Chloromethane	42.0	-	UJ
	6/4/96	Chloromethane	-	64.3	UJ
		Chloroethane	-	37.9	UJ
	6/6/96	4-Nitroaniline	-	29.2	UJ
		Di-n-octylphthalate	-	25.2	UJ
WF019	All	Volatiles	-	-	None
	6/11/96	Hexachlorobenzene	-	30.8	UJ

Table VII
Summary of Compounds Exceeding Instrument Calibration
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF020	All	Volatiles	-	-	None
	6/26/96	Bis(2-ethylhexyl)phthalate	-	28.6	UJ
		Di-n-octylphthalate	-	33.8	UJ

Notes: %RSD = percent Relative Standard Deviation for initial calibrations

%D = percent Difference for continuing calibrations

J = the compound was positively identified; the associated numerical value is the approximate concentration of the compound in the sample, either because its concentration was lower than the QL (laboratory "J" flag), or because QC criteria were not met (validation "J").

UJ = the compound was not detected above the reported sample QL. However, the reported sample QL is approximate; the compound concentration may not reliably be presumed to be less than the QL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the compound cannot be verified.

Table VIII
Summary of Method Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	**Compound**	**Concentration**	**Associated Samples**
WF016	Acetone	2 ug/Kg	BKB00101 BKB00401 BKB00401D BKB00402 BKB00201 BKB00202 BKB00301 BKB00302 BKB00501 BKB00502 BKB00601 BKB00602
	Acetone	1 ug/Kg	BKB00602D
	Bis(2-ethylhexyl)phthalate	12 ug/L	BKR00201 BKF00101
	Pestcides/PCBs	ND	-
WF017	Acetone	1 ug/Kg	31B00601 31B00605 12B00101 12B00101D 12B00102 31B00702 31B00703 31B00704 31B00705 31B00801 31B00802 31B00803
	Acetone	2 ug/Kg	31B00701 31B00804 31B00805
	Acetone	2 ug/Kg	31B00803DL 31B00804DL
	Bis(2-ethylhexylphthalate	2 ug/L	31R00101
	Bis(2-ethylhexylphthalate	2 ug/L	12R00101
	Pesticides/PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	**Compound**	**Concentration**	**Associated Samples**
WF018	Acetone	2 ug/Kg	30B00201 30B00203
	Acetone	2 ug/Kg	30B00202 30B00202D 30B00101 30B00102 30B00103
	Bis(2-ethylhexyl)phthalate	43 ug/Kg	30B00201 30B00202 30B00203 30B00202D 30B00101 30B00102 30B00103
WF019	Methylene chloride Acetone	5 ug/Kg 5 ug/Kg	30B00501 30B00502 30B00503 30B00502D 30B00401 30B00402 30B00403
	Acetone	5 ug/Kg	30B00601 30B00602 30B00603 30B00602D 30B00301 30B00302 30B00303 30B00305
	Bis(2-ethylhexyl)phthalate	1 ug/L	30R00201
	Bis(2-ethylhexyl)phthalate	59 ug/Kg	30B00601 30B00602 30B00603 30B00602D 30B00301 30B00302 30B00303 30B00303DL 30B00305

Table VIII
Summary of Method Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF020	Acetone	5 ug/Kg	33B00301
			33B00302
			33B00303
			33B00304
			33B00305
			33B00302D
			33B00201
			33B00202
			33B00203
			33B00101
			33B00102
			33B00103
			33B00102D
	Bis(2-ethylhexyl)phthalate	6 ug/L	33R00101
	Bis(2-ethylhexyl)phthalate	43 ug/Kg	33B00301
			33B00302
			33B00303
			33B00304
			33B00302D
			33B00201
			33B00202
			33B00203
			33B00101
			33B00102
			33B00103
			33B00102D
	Bis(2-ethylhexylphthalate	300 ug/Kg	33B00305RE

Table IX
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	**Parameter**	**Concentration**	**Qualifier**
WF016	**Client ID:** BKR00201 **Laboratory ID:** RB583008 **Collection Date:** 5/20/96 **Type:** Equipment Rinsate		
	Acetone	2 ug/L	None
	Di-n-butylphthalate	8 ug/L	None
	Bis(2-ethylhexyl)phthalate	3 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None
WF016	**Client ID:** BKT00201 **Laboratory ID:** RB583010 **Collection Date:** 5/20/96 **Type:** Trip Blank		
	Methylene chloride	1 ug/L	None
	Acetone	13 ug/L	None
WF016	**Client ID:** BKF00101 **Laboratory ID:** RB583009 **Collection Date:** 5/20/96 **Type:** Source Blank		
	Acetone	23 ug/L	None
	Di-n-butylphthalate	9 ug/L	None
	Bis(2-ethylhexyl)phthalate	3 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None
WF017	**Client ID:** 12R00101 **Laboratory ID:** RB592022 **Collection Date:** 5/21/96 **Type:** Rinsate		
	Acetone	8 ug/L	None
	Di-n-butylphthalate	9 ug/L	None
	Bis(2-ethylhexyl)phthalate	15 ug/L	15U ug/L[1]
	Butylbenzylphthalate	2 ug/L	None
	Pesticides/PCBs	ND	None
WF017	**Client ID:** 31R00101 **Laboratory ID:** RB592020 **Collection Date:** 5/22/96 **Type:**		
	Acetone	17 ug/L	None
	Di-n-butylphthalate	6 ug/L	None
	Bis(2-ethylhexyl)phthalate	6 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None

Table IX
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF017	**Client ID:**	**31T00301**		
	Laboratory ID:	**RB592021**		
	Collection Date:	**5/22/96**		
	Type:	**Trip Blank**		
	Acetone		4 ug/L	None
WF017	**Client ID:**	**BKT00301**		
	Laboratory ID:	**RB592023**		
	Collection Date:	**5/21/96**		
	Type:	**Trip Blank**		
	Acetone		3 ug/L	None
WF018	**Client ID:**	**30T00101**		
	Laboratory ID:	**RB602011**		
	Collection Date:	**5/23/96**		
	Type:	**Trip Blank**		
	Methylene chloride		3 ug/L	None
	Acetone		10 ug/L	None
WF018	**Client ID:**	**30R00101**		
	Laboratory ID:	**RB602010**		
	Collection Date:	**5/23/96**		
	Type:	**Rinsate**		
	Acetone		6 ug/L	None
	Di-n-butylphthalate		9 ug/L	None
WF019	**Client ID:**	**30T00201**		
	Laboratory ID:	**MB047011**		
	Collection Date:	**6/4/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF019	**Client ID:**	**30T00301**		
	Laboratory ID:	**MB068002**		
	Collection Date:	**6/5/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF019	**Client ID:**	**30R00201**		
	Laboratory ID:	**MB047010**		
	Collection Date:	**6/4/96**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Di-n-butylphthalate		3 ug/L	None
	Bis(2-ethylhexyl)phthalate		4 ug/L	10U ug/L[1]

Table IX
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF019	**Client ID:**	**30R00301**		
	Laboratory ID:	**MB068001**		
	Collection Date:	**6/5/96**		
	Type:	**Rinsate**		
	Methylene chloride		3 ug/L	None
	Di-n-butylphthalate		7 ug/L	None
	Bis(2-ethylhexyl)phthalate		4 ug./L	None
WF019	**Client ID:**	**30F00101**		
	Laboratory ID:	**MB068003**		
	Collection Date:	**6/5/96**		
	Type:	**Source Blank**		
	Acetone		29 ug/L	None
	Di-n-butylphthalate		13 ug/L	None
WF020	**Client ID:**	**33T00101**		
	Laboratory ID:	**MB080017**		
	Collection Date:	**6/6/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF020	**Client ID:**	**33R00101**		
	Laboratory ID:	**MB080016**		
	Collection Date:	**6/6/96**		
	Type:	**Rinsate**		
	Acetone		15 ug/L	None
	Di-n-butylphthalate		13 ug/L	None
	Bis(2-ethylhexyl)phthalate		3 ug/L	10U ug/L[1]

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Client ID	Analyte	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF016	BKB00401	All metals Cyanide	- -	- -	- -	- -	- -	None None
WF016	BKR00201	Metals	-	-	-	-	-	None
WF016	BKF00101	Cyanide	-	-	-	-	-	None
WF017	31B00601	Lead Cyanide	75-125 -	≤35 -	179.2 -	- -	49.3 -	J None
WF018	30B00202	Lead	-	-	-	-	-	None
WF019	30B00502	Lead	-	-	-	-	-	None
WF019	30F00101	Lead	-	-	-	-	-	None
WF019	30B00601	Lead	75-125	-	66.4	-	-	J
WF020	33B00302	Lead	-	-	-	-	-	None

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF016	**Client ID**	**BKB00401**	**BKB00401D**	
	Laboratory ID	**RB583003**	**RB583004**	
	Collection Date	**5/20/96**	**5/20/96**	
	Aluminum	3600 mg/Kg	2290 mg/Kg	44
	Arsenic	0.54 mg/Kg	0.79 mg/Kg	38
	Barium	7.2 mg/Kg	6.4 mg/Kg	12
	Beryllium	ND	0.07 mg/Kg	Not calculable
	Calcium	194 mg/Kg	203 mg/Kg	5
	Chromium	3.2 mg/Kg	2.4 mg/Kg	29
	Cobalt	0.77 mg/Kg	0.58 mg/Kg	28
	Copper	1.8 mg/Kg	1.7 mg/Kg	6
	Iron	2220 mg/Kg	1660 mg/Kg	29
	Lead	1.4 mg/Kg	2.4 mg/Kg	53
	Magnesium	114 mg/Kg	93.0 mg/Kg	20
	Manganese	19.5 mg/Kg	14.5 mg/Kg	29
	Nickel	1.5 mg/Kg	ND	Not calculable
	Potassium	84.5 mg/Kg	ND	Not calculable
	Sodium	27.6 mg/Kg	22.5 mg/Kg	20
	Vavadium	4.9 mg/Kg	3.4 mg/Kg	36
	Zinc	3.9 mg/Kg	2.7 mg/Kg	36
	Cyanide	0.10 mg/Kg	0.13 mg/Kg	26
WF016	**Client ID**	**BKB00602**	**BKB00602D**	
	Laboratory ID	**RB583016**	**RB583017**	
	Collection Date	**5/21/96**	**5/21/96**	
	Aluminum	5040 mg/Kg	6050 mg/Kg	18
	Arsenic	1.4 mg/Kg	0.95 mg/Kg	38
	Barium	5.2 mg/Kg	5.9 mg/Kg	13
	Calcium	210 mg/Kg	195 mg/Kg	7
	Chromium	4.5 mg/Kg	4.7 mg/Kg	4
	Copper	2.0 mg/Kg	2.3 mg/Kg	14
	Iron	3430 mg/Kg	3820 mg/Kg	11
	Lead	1.8 mg/Kg	1.7 mg/Kg	6
	Magnesium	97.6 mg/Kg	111 mg/Kg	13
	Manganese	9.5 mg/Kg	11.1 mg/Kg	16
	Nickel	1.6 mg/Kg	ND	Not calculable
	Sodium	28.6 mg/Kg	26.2 mg/Kg	9
	Vanadium	10.3 mg/Kg	11.3 mg/Kg	9
	Zinc	3.2 mg/Kg	3.1 mg/Kg	3
	Cyanide	0.13 mg/Kg	0.16 mg/Kg	21

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF017	**Client ID**	**31B00601**	**31B00601D**	
	Laboratory ID	**RB295001**	**RB592006**	
	Collection Date	**5/21/96**	**5/21/96**	
	Aluminum	1580 mg/Kg	1760 mg/Kg	11
	Arsenic	0.44 mg/Kg	0.29 mg/Kg	41
	Barium	7.4 mg/Kg	9.6 mg/Kg	26
	Beryllium	0.07 mg/Kg	0.07 mg/Kg	0
	Cadmium	0.52 mg/Kg	0.68 mg/Kg	27
	Calcium	237 mg/Kg	297 mg/Kg	22
	Chromium	3.9 mg/Kg	5.4 mg/Kg	32
	Copper	11.4 mg/Kg	13.6 mg/Kg	18
	Iron	1120 mg/Kg	1310 mg/Kg	16
	Lead	6.3 mg/Kg	7.0 mg/Kg	11
	Magnesium	83.5 mg/Kg	98.7 mg/Kg	17
	Manganese	9.2 mg/Kg	11.3 mg/Kg	20
	Mercury	0.07 mg/Kg	0.08 mg/Kg	13
	Selenium	0.14 mg/Kg	ND mg/Kg	Not calculable
	Silver	1.1 mg/Kg	1.7 mg/Kg	43
	Sodium	23.5 mg/Kg	26.3 mg/Kg	11
	Vanadium	2.2 mg/Kg	2.4 mg/Kg	9
	Zinc	11.0 mg/Kg	15.9 mg/Kg	36
	Cyanide	0.10 mg/Kg	ND	Not calculable
WF017	**Client ID**	**12B00101**	**12B00101D**	
	Laboratory ID	**RB592007**	**RB592008**	
	Collection Date	**5/21/96**	**5/21/96**	
	Aluminum	25400 mg/Kg	8890 mg/Kg	96
	Arsenic	5.3 mg/Kg	1.2 mg/Kg	126
	Barium	18.0 mg/Kg	14.5 mg/Kg	22
	Beryllium	0.20 mg/Kg	ND	Not calculable
	Cadmium	0.57 mg/Kg	ND	Not calculable
	Calcium	495 mg/Kg	552 mg/Kg	11
	Chromium	19.9 mg/Kg	9.1 mg/Kg	74
	Copper	6.3 mg/Kg	2.9 mg/Kg	74
	Iron	16100 mg/Kg	8620 mg/Kg	61
	Lead	4.7 mg/Kg	3.4 mg/Kg	32
	Magnesium	170 mg/Kg	96.7 mg/Kg	55
	Manganese	7.7 mg/Kg	4.9 mg/Kg	44
	Mercury	0.04 mg/Kg	0.04 mg/Kg	0
	Nickel	2.5 mg/Kg	ND	Not calculable
	Potassium	81.2 mg/Kg	ND	Not calculable
	Sodium	49.8 mg/Kg	33.4 mg/Kg	39
	Vanadium	41.7 mg/Kg	26.5 mg/Kg	45
	Zinc	3.6 mg/Kg	3.7 mg/Kg	3
	Cyanide	ND	ND	None
WF018	**Client ID**	**30B00202**	**30B00202D**	
	Laboratory ID	**RB602002**	**RB602005**	
	Collection Date	**5/23/96**	**5/23/96**	
	Lead	1.8 mg/Kg	1.9 mg/Kg	5
WF019	**Client ID**	**30B00502**	**30B00502D**	
	Laboratory ID	**MB047002**	**MB047005**	
	Collection Date	**6/4/96**	**6/4/96**	
	Lead	4.3 mg/Kg	3.9 mg/Kg	10
WF019	**Client ID**	**30B00602**	**30B00602D**	
	Laboratory ID	**MB068005**	**MB068009**	
	Collection Date	**6/5/96**	**6/5/96**	
	Lead	4.5 mg/Kg	5.0 mg/Kg	11

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF020	**Client ID** **Laboratory ID** **Collection Date** Lead	**33B00302** **MB080002** **6/6/96** 7.8 mg/Kg	**33B00302D** **MB080007** **6/6/96** 7.1 mg/Kg	9
WF020	**Client ID** **Laboratory ID** **Collection Date** Lead	**33B00102** **MB080013** **6/6/96** 7.2 mg/Kg	**33B00102D** **MB080015** **6/6/96** 8.0 mg/Kg	11

Table XII
Summary of Analytes Exceeding Instrument Calibration
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Date	Analyte	Criteria		Qualifier
			Initial Calibration r	Continuing Calibration %R	
WF016	All	All metals Cyanide	- -	- -	None None
WF017	All	All metals Cyanide	- -	- -	None None
WF018	All	Lead	-	-	None
WF019	All	Lead	-	-	None
WF020	All	Lead	-	-	None

Notes: r = correlation coefficient for initial calibrations

%R = percent recovery for continuing calibrations

J = the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample because QC criteria were not met (validation "J").

UJ = the analyte was not detected above the reported sample IDL. However, the reported sample is approximate; the analyte concentration may not reliably be presumed to be less than the IDL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table XIII
Summary of Method Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF016	Barium Iron Sodium Zinc	1.760 ug/L 31.120 ug/L 88.880 ug/L 16.920 ug/L	All water samples in SDG WF016
	Aluminum Calcium Copper Iron Sodium Thallium Zinc	3.309 mg/Kg 11.435 mg/Kg 0.249 mg/Kg 1.650 mg/Kg 5.214 mg/Kg 0.001 mg/Kg 1.342 mg/Kg	All soil samples in SDG WF016
	Cyanide	ND	All samples in SDG WF016
WF017	Barium Iron Sodium Zinc	1.760 ug/L 31.120 ug/L 88.880 ug/L 16.920 ug/L	All water samples in SDG WF017
	Aluminum Calcium Cobalt Copper Sodium Zinc	3.309 mg/Kg 11.435 mg/Kg 0.249 mg/Kg 1.650 mg/Kg 5.214 mg/Kg 1.342 mg/Kg	All soil samples in SDG WF017
	Cyanide	ND	All samples in SDG WF017
WF018	Lead	ND	All samples in SDG WF018
WF019	Lead	2.260 ug/L	All water samples in SDG WF019
WF020	Lead	ND	All samples in SDG WF020

Table XIV
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF016	**Client ID:**	**BKR00201**		
	Laboratory ID:	**RB583008**		
	Collection Date:	**5/20/96**		
	Type:	**Rinsate**		
	Barium		1.8 ug/L	1.7U ug/L[1]
	Iron		5.6 ug/L	5.6U ug/L[1]
	Lead		2.3 ug/L	None
	Sodium		57.5 ug/L	57.5U ug/L[1]
	Zinc		3.0 ug/L	3.0U ug/L[1]
	Cyanide		1.8 ug/L	None
WF016	**Client ID:**	**BKF00101**		
	Laboratory ID:	**RB583009**		
	Collection Date:	**5/20/96**		
	Type:	**Source Blank**		
	Iron		6.4 ug/L	6.4U ug/L[1]
	Sodium		52.9 ug/L	52.9U ug/L[1]
	Zinc		3.8 ug/L	3.8U ug/L[1]
	Cyanide		ND	None
WF017	**Client ID:**	**31R00101**		
	Laboratory ID:	**RB592020**		
	Collection Date:	**5/22/96**		
	Type:	**Rinsate**		
	Aluminum		86.5 ug/L	None
	Barium		2.3 ug/L	2.3U ug/L[1]
	Calcium		503 ug/L	None
	Chromium		11.3 ug/L	None
	Copper		1.4 ug/L	None
	Iron		132 ug/L	132U ug/L[1]
	Lead		0.60 ug/L	None
	Magnesium		66.2 ug/L	None
	Manganese		3.8 ug/L	None
	Sodium		264 ug/L	None
	Zinc		7.8 ug/L	7.8U ug/L[1]
	Cyanide		ND	None
WF017	**Client ID:**	**12R00101**		
	Laboratory ID:	**RB592022**		
	Collection Date:	**5/21/96**		
	Type:	**Rinsate**		
	Aluminum		19.1 ug/L	None
	Barium		1.8 ug/L	1.8U ug/L[1]
	Calcium		86.5 ug/L	None
	Iron		15.6 ug/L	15.6U ug/L[1]
	Lead		0.60 ug/L	None
	Magnesium		30.5 ug/L	None
	Sodium		59.8 ug/L	None
	Zinc		3.8 ug/L	3.8U ug/L[1]
	Cyanide		ND	None

Table XIV
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes				
SDG	**Parameter**		**Concentration**	**Qualifier**
WF018	**Client ID:**	**30R00101**		
	Laboratory ID:	**RB602010**		
	Collection Date:	**5/23/96**		
	Type:	**Rinsate**		
	Lead		ND	None
WF019	**Client ID:**	**30R00201**		
	Laboratory ID:	**MB047010**		
	Collection Date:	**6/4/96**		
	Type:	**Rinsate**		
	Lead		ND	None
WF019	**Client ID:**	**30R00301**		
	Laboratory ID:	**MB068001**		
	Collection Date:	**6/5/96**		
	Type:	**Rinsate**		
	Lead		ND	None
WF019	**Client ID:**	**30F00101**		
	Laboratory ID:	**MB068003**		
	Collection Date:	**6/5/96**		
	Type:	**Source Blank**		
	Lead		2.1 ug/L	2.1U ug/L[1]
WF020	**Client ID:**	**33R00101**		
	Laboratory ID:	**MB080016**		
	Collection Date:	**6/6/96**		
	Type:	**Rinsate**		
	Lead		1.6 ug/L	None

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

Table XV
Sample Event PARCC Summary
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF016	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF017	Volatiles	Acceptable	Acceptable	Acceptable	100[3]	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF018	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Lead	Acceptable	Acceptable	Acceptable	100	Acceptable
WF019	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100[3]	Acceptable
	Lead	Acceptable	Acceptable	Acceptable	100	Acceptable
WF020	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Lead	Acceptable	Acceptable	Acceptable	100	Acceptable

[1]Cumulative of sampling and analytical components.
[2]Analytical component.
[3]Samples results rejected for database purposes were not used in the completeness calculation.

Notes: All completeness is expressed as the ratio of number of sample results considered usable (i.e., not qualified as rejected) to the total number of sample results.

% = percent

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APPENDIX A

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida
PARCC Summary Tables

Final Version

5/1/96

APPENDIX A

Table of Contents

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

e I

SDG#: WF006 | **Sample Delivery Group Versus Sample Identification** | **LDC#: 1779A**

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#: 8532-20**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide	TRPH
01T00101	G8864001	TB	water	12-5-95	X					
01S00101	G8864002		soil	12-5-95	X	X	X	X	X	
01S00201	G8864003		soil	12-5-95	X	X	X	X	X	
01S00301	G8864004		soil	12-5-95	X	X	X	X	X	
01S00401	G8864005		soil	12-5-95	X	X	X	X	X	
01S00501	G8864006		soil	12-5-95	X	X	X	X	X	
02S00401	G8864007	FD	soil	12-5-95	X	X	X	X	X	
02S00401D	G8864008	FD	soil	12-5-95	X	X	X	X	X	
02S00401DDL	G8864008DL		soil	12-5-95		X				
02T00101	G8876001	TB	water	12-6-95	X					
02S00101	G8876002		soil	12-6-95	X	X	X	X	X	
02S00201	G8876003		soil	12-6-95	X	X	X	X	X	
02S00301	G8876004		soil	12-6-95	X	X	X	X	X	
02S00501	G8876005		soil	12-6-95	X	X	X	X	X	
09S00101	G8876006		soil	12-6-95	X	X	X	X	X	X
09S00201	G8876007		soil	12-6-95	X	X	X	X	X	X
09S00401	G8876008		soil	12-6-95	X	X	X	X	X	X
09S00501	G8876009		soil	12-6-95	X	X	X	X	X	X
09S00301	G8876010	FD	soil	12-6-95	X	X	X	X	X	X
09S00301D	G8876011	FD	soil	12-6-95	X	X	X	X	X	X
01R00101	G8876012	R	water	12-6-95	X	X	X	X	X	X
01F00101	G8876013	SB	water	12-6-95	X	X	X	X	X	X
02S00401MS	G8864007MS	MS	soil	12-5-95	X	X	X	X	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF006					Sample Delivery Group Versus Sample Identification					LDC#: 1779A
Project Name: NAS Whiting Field					Parameters/Analytical Method					**Job#: 8532-20**
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/PCBs**	**Metals**	**Cyanide**	**TRPH**
02S00401MSD	G8864007MSD	MSD	soil	12-5-95	X	X	X	X	X	
09S00101MS	G8876006MS	MS	soil	12-6-95						X
09S00101DUP	G8876006MSD	DUP	soil	12-6-95						X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

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SDG#: WF007 — **Sample Delivery Group Versus Sample Identification** — **LDC#: 1779B**

Project Name: NAS Whiting Field — Parameters/Analytical Method — **Job#: 8532-20**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide	TRPH
10T00101	G8889001	TB	water	12-7-95	X					
10S00101	G8889002	FD	soil	12-7-95	X	X	X	X	X	X
10S00101R	G8889002R		soil	12-7-95		X				
10S00101D	G8889003	FD	soil	12-7-95	X	X	X	X	X	X
10S00401	G8889004		soil	12-7-95	X	X	X	X	X	X
10S00601	G8889005		soil	12-7-95	X	X	X	X	X	X
12S00301	G8889006		soil	12-7-95	X	X	X	X	X	X
12S00101	G8889007		soil	12-7-95	X	X	X	X	X	X
12S00601	G8889008		soil	12-7-95	X	X	X	X	X	X
10R00101	G8889009	R	water	12-7-95	X	X	X	X	X	X
13T00101	G8895001	TB	water	12-8-95	X					
13S00101	G8895002		soil	12-8-95	X	X	X	X	X	
13S00201	G8895003		soil	12-8-95	X	X	X	X	X	
13S00301	G8895004		soil	12-8-95	X	X	X	X	X	
13S00401	G8895005		soil	12-8-95	X	X	X	X	X	
13S00501	G8895006		soil	12-8-95	X	X	X	X	X	
14S00101	G8895007	FD	soil	12-8-95	X	X	X	X	X	
14S00101D	G8895008	FD	soil	12-8-95	X	X	X	X	X	
14S00201	G8895009		soil	12-8-95	X	X	X	X	X	
14S00301	G8895010		soil	12-8-95	X	X	X	X	X	
10S00101MS	G8889002MS	MS	soil	12-7-95	X		X	X	X	X
10S00101MSD	G8889002MSD	MSD	soil	12-7-95	X		X	X	X	X
10S00101RMS	G8889002RMS	MS	soil	12-7-95		X				

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF007					Sample Delivery Group Versus Sample Identification					LDC#: 1779B
Project Name: NAS Whiting Field					Parameters/Analytical Method					**Job#: 8532-20**
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/PCBs**	**Metals**	**Cyanide**	**TRPH**
10S00101RMSD	G8889002RMSD	MSD	soil	12-7-95		X				

TP = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

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SDG#: WF008	Sample Delivery Group Versus Sample Identification	LDC#: 1779C
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
15T00101	G8913001	TB	water	12-9-95	X				
15S02001	G8913002	FD	soil	12-9-95	X	X	X	X	X
15S02001D	G8913003	FD	soil	12-9-95	X	X	X	X	X
15S02101	G8913004		soil	12-9-95	X	X	X	X	X
15S02201	G8913005		soil	12-9-95	X	X	X	X	X
15S02301	G8913006		soil	12-9-95	X	X	X	X	X
15S02401	G8913007		soil	12-9-95	X	X	X	X	X
15S02501	G8913008		soil	12-9-95	X	X	X	X	X
15S01501	G8913009		soil	12-9-95	X	X	X	X	X
15S01401	G8913010		soil	12-9-95	X	X	X	X	X
15S01301	G8913011		soil	12-9-95	X	X	X	X	X
15S01601	G8913012		soil	12-10-95	X	X	X	X	X
15S01701	G8913013	FD	soil	12-10-95	X	X	X	X	X
15S01701D	G8913014	FD	soil	12-10-95	X	X	X	X	X
15S01801	G8913015		soil	12-10-95	X	X	X	X	X
15S01901	G8913016		soil	12-10-95	X	X	X	X	X
15S00901	G8913017		soil	12-11-95	X	X	X	X	X
15S00901RE	G8913017RE		soil	12-11-95		X			
15R00101	G8913020	R	water	12-11-95	X	X	X	X	X
15S02001MS	G8913002MS	MS	soil	12-9-95	X	X	X	X	X
15S02001MSD	G8913002MSD	MSD	soil	12-9-95	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF009	Sample Delivery Group Versus Sample Identification	LDC#: 1779D
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
15T00201	G8914001	TB	water	12-11-95	X				
15S00101	G8914002	FD	soil	12-11-95	X	X	X	X	X
15S00101R	G8914002R		soil	12-11-95		X			
15S00101D	G8914003	FD	soil	12-11-95	X	X	X	X	X
15S00201	G8914004		soil	12-11-95	X	X	X	X	X
15S00301	G8914005		soil	12-11-95	X	X	X	X	X
15S00501	G8914006		soil	12-11-95	X	X	X	X	X
15S00401	G8914007		soil	12-11-95	X	X	X	X	X
15S00601	G8914008		soil	12-11-95	X	X	X	X	X
15S00701	G8914009		soil	12-11-95	X	X	X	X	X
15S00801	G8914010		soil	12-11-95	X	X	X	X	X
15S01201	G8914011		soil	12-11-95	X	X	X	X	X
15R00201	G8914012	R	water	12-11-95	X	X	X	X	X
15S01101	G8914013		soil	12-10-95	X	X	X	X	X
15S01001	G8914014		soil	12-10-95	X	X	X	X	X
15S00101MS	G8914002MS	MS	soil	12-11-95	X	X	X	X	X
15S00101MSD	G8914002MSD	MSD	soil	12-11-95	X	X	X	X	X
15S00101RMS	G8914002RMS	MS	soil	12-11-95		X			
15S00101RMSD	G8914002RMSD	MSD	soil	12-11-95		X			

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: WF010 | **Sample Delivery Group Versus Sample Identification** | **LDC#: 1779E**

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#: 8532-20**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
31S00101	G8924001		soil	12-12-95	X	X	X	X	X
31S00201	G8924002		soil	12-12-95	X	X	X	X	X
31S00301	G8924003		soil	12-12-95	X	X	X	X	X
31S00401	G8924004		soil	12-12-95	X	X	X	X	X
31T00101	G8924005	TB	water	12-12-95	X				
31R00101	G8924006	R	water	12-12-95	X	X	X	X	X
31T00201	G8938001	TB	water	12-13-95	X				
31S01501	G8938002	FD	soil	12-13-95	X	X	X	X	X
31S01501D	G8938003	FD	soil	12-13-95	X	X	X	X	X
31S01601	G8938004		soil	12-13-95	X	X	X	X	X
31S01701	G8938005		soil	12-13-95	X	X	X	X	X
31S01801	G8938006		soil	12-13-95	X	X	X	X	X
31S01901	G8938007		soil	12-13-95	X	X	X	X	X
31S01501MS	G8938002MS	MS	soil	12-13-95	X	X	X	X	X
31S01501MSD	G8938002MSD	MSD	soil	12-13-95	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF11A					Sample Delivery Group Versus Sample Identification					LDC#: 1777A
Project Name: NAS Whiting Field					Parameters/Analytical Method					**Job#: 8532-20**
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/PCBs**	**Metals**	**Cyanide**	**TRPH**
09W00101	RA903001	FD	water	1-5-96	X	X	X	X	X	X
09W00101D	RA903002	FD	water	1-5-96	X	X	X	X	X	X
16W00101	RA903003		water	1-5-96	X	X	X	X	X	
09W00101MS	RA903001MS	MS	water	1-5-96	X	X	X	X	X	X
09W00101MSD	RA903001MSD	MSD	water	1-5-96	X	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: WF11B	Sample Delivery Group Versus Sample Identification	LDC#: 1777B
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide	TRPH
12T00101	RA847001	TB	water	1-5-96	X					
10S00201	RA847002	FD	soil	1-5-96	X	X	X	X	X	X
10S00201DL	RA847002DL		soil	1-5-96		X				
10S00201D	RA847003	FD	soil	1-5-96	X	X	X	X	X	X
10S00301	RA847004		soil	1-5-96	X	X	X	X	X	X
10S00301R	RA847004R		soil	1-5-96		X				
10S00501	RA847005		soil	1-5-96	X	X	X	X	X	X
12S00201	RA847006		soil	1-5-96	X	X	X	X	X	X
12S00401	RA847007		soil	1-5-96	X	X	X	X	X	X
12S00501	RA847008		soil	1-5-96	X	X	X	X	X	X
12R00101	RA847012	R	water	1-5-96	X	X	X	X	X	X
11T00101	RA847013	TB	water	1-6-96	X					
11S00101	RA847014		soil	1-6-96	X	X	X	X	X	X
11S00201	RA847015		soil	1-6-96	X	X	X	X	X	X
11S00201DL	RA847015DL		soil	1-6-96			X			
11S00201R	RA847015R		soil	1-6-96	X					
11S00501	RA847016		soil	1-6-96	X	X	X	X	X	X
11S00401	RA847017		soil	1-7-96	X	X	X	X	X	X
11S00301	RA847018		soil	1-7-96	X	X	X	X	X	X
10S00201MS	RA847002MS	MS	soil	1-5-96	X	X	X	X	X	X
10S00201MSD	RA847002MSD	MSD	soil	1-5-96	X	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF012	Sample Delivery Group Versus Sample Identification	LDC#: 1777C
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/ PCBs	Metals	Cyanide	Lead	TCLP Metals
11S00601	RA855001	FD	soil	1-7-96						X	
11S00601D	RA855002	FD	soil	1-7-96						X	
11S00701	RA855003		soil	1-7-96						X	
11S00801	RA855004		soil	1-7-96						X	
11S00901	RA855005		soil	1-7-96						X	
11S01001	RA855006		soil	1-7-96						X	
11S01101	RA855007		soil	1-7-96						X	
11S01201	RA855008		soil	1-7-96						X	
11S01301	RA855009		soil	1-7-96						X	
31S00401	RA855010		soil	1-7-96	X	X	X	X	X		
31S00501	RA855011	FD	soil	1-7-96	X	X	X	X	X		
31S00501D	RA855012	FD	soil	1-7-96	X	X	X	X	X		
31S00601	RA855013		soil	1-7-96	X	X	X	X	X		
31S00701	RA855014		soil	1-7-96	X	X	X	X	X		
31S01001	RA855015		soil	1-7-96	X	X	X	X	X		
31S01101	RA855016		soil	1-7-96	X	X	X	X	X		
31S00901	RA855017		soil	1-7-96	X	X	X	X	X		
31S00801	RA855018		soil	1-7-96	X	X	X	X	X		
31S01201	RA855019		soil	1-8-96	X	X	X	X	X		
31S01201R	RA855019R		soil	1-8-96	X						
31S01301	RA855020		soil	1-8-96	X	X	X	X	X		
31R00201	RA855021	R	water	1-8-96	X	X	X	X	X		
31S00401	RA857001		soil	1-7-96							X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

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SDG#: WF012					Sample Delivery Group Versus Sample Identification						LDC#: 1777C
Project Name: NAS Whiting Field					Parameters/Analytical Method						**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/ PCBs**	**Metals**	**Cyanide**	**Lead**	**TCLP Metals**
31S00501	RA857002	FD	soil	1-7-96							X
31S00501D	RA857003	FD	soil	1-7-96							X
31S00601	RA857004		soil	1-7-96							X
31S00701	RA847005		soil	1-7-96							X
31S01001	RA857006		soil	1-7-96							X
31S01101	RA857007		soil	1-7-96							X
31S00901	RA857008		soil	1-7-96							X
31S00801	RA857009		soil	1-7-96							X
31S01201	RA857010		soil	1-8-96							X
31S01301	RA857011		soil	1-8-96							X
31S00501MS	RA855011MS	MS	soil	1-7-96	X	X	X	X	X		
31S00501MSD	RA855011MSD	MSD	soil	1-7-96	X	X	X	X	X		
31S00501MS	RA857002MS	MS	soil	1-7-96							X
31S00501MSD	RA857002MSD	MSD	soil	1-7-96							X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF013 — **Sample Delivery Group Versus Sample Identification** — **LDC#: 1777D**

Project Name: NAS Whiting Field — Parameters/Analytical Method — **Job#: 8532-20**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/ PCBs	Metals	Cyanide
16S00101	RA856001	FD	soil	1-8-96	X	X	X	X	X
16S00501	RA856002		soil	1-8-96	X	X	X	X	X
16S00401	RA856003		soil	1-8-96	X	X	X	X	X
16S00901	RA856004		soil	1-8-96	X	X	X	X	X
16S00901R	RA856004R		soil	1-8-96		X			
16S01501	RA856005		soil	1-8-96	X	X	X	X	X
16S00201	RA856006		soil	1-9-96	X	X	X	X	X
16S00301	RA856007		soil	1-9-96	X	X	X	X	X
16S00801	RA856008		soil	1-9-96	X	X	X	X	X
16S00801RE	RA856008RE		soil	1-9-96		X			
16S00601	RA856009		soil	1-9-96	X	X	X	X	X
16S00601DL	RA856009DL		soil	1-9-96		X			
16S01201	RA856010		soil	1-9-96	X	X	X	X	X
16S01301	RA856011		soil	1-9-96	X	X	X	X	X
BKS00301	RA856012		soil	1-9-96	X	X	X	X	X
BKS00101	RA856013		soil	1-9-96	X	X	X	X	X
16S01001	RA856014	FD	soil	1-9-96	X	X	X	X	X
16S01001D	RA856015	FD	soil	1-9-96	X	X	X	X	X
16T00101	RA856016	TB	water	1-9-96	X				
16R00101	RA856017	R	water	1-9-96	X	X	X	X	X
16S00101D	RA856018	FD	soil	1-9-96	X	X	X	X	X
24T00101	RA871001	TB	water	1-10-96	X				
24S00101	RA871002		soil	1-10-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: WF013 **Sample Delivery Group Versus Sample Identification** **LDC#:** 1777D

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/ PCBs	Metals	Cyanide
16S01001MS	RA856014MS	MS	soil	1-9-96	X	X	X	X	X
16S01001MSD	RA856014MSD	MSD	soil	1-9-96	X	X	X	X	X
24S00101MS	RA871002MS	MS	soil	1-10-96					X
24S00101MSD	RA871002MSD	MSD	soil	1-10-96					X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF014					Sample Delivery Group Versus Sample Identification				LDC#: 1777E
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/PCBs**	**Metals**	**Cyanide**
BKR00101	RA870001	R	water	1-10-96	X	X	X	X	X
BKT00101	RA870002	TB	water	1-10-96	X				
16S01401	RA870003		soil	1-10-96	X	X	X	X	X
16S00701	RA870004		soil	1-10-96	X	X	X	X	X
16S01101	RA870005		soil	1-10-96	X	X	X	X	X
16S01701	RA870006		soil	1-10-96	X	X	X	X	X
16S01601	RA870007		soil	1-10-96	X	X	X	X	X
BKS00201	RA870008	FD	soil	1-10-96	X	X	X	X	X
BKS00201D	RA870009	FD	soil	1-10-96	X	X	X	X	X
BKS00501	RA870010		soil	1-10-96	X	X	X	X	X
BKS00401	RA870011		soil	1-10-96	X	X	X	X	X
31B00401	RA870012		soil	1-11-96	X	X	X	X	X
31B00301	RA870013		soil	1-11-96	X	X	X	X	X
31B00201	RA870014	FD	soil	1-11-96	X	X	X	X	X
31B00201D	RA870015	FD	soil	1-11-96	X	X	X	X	X
31B00101	RA870016		soil	1-11-96	X	X	X	X	X
31B00501	RA870017		soil	1-11-96	X	X	X	X	X
31T00201	RA870018	TB	water	1-11-96	X				
BKS00201MS	RA870008MS	MS	soil	1-10-96	X	X	X	X	X
BKS00201MSD	RA870008MSD	MSD	soil	1-10-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

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SDG#: WF015	Sample Delivery Group Versus Sample Identification	LDC#: 1777F
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#: 8532-20**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
COR00101	RA908001	R	water	1-18-96	X	X	X	X	X
COF00101	RA908002	SB	water	1-18-96	X	X	X	X	X
COT00101	RA908003	TB	water	1-18-96	X				
COS00101	RA908004	FD	soil	1-18-96	X	X	X	X	X
COS00101D	RA908005	FD	soil	1-18-96	X	X	X	X	X
EOS00101	RA908006		soil	1-18-96	X	X	X	X	X
POS00101	RA908007		soil	1-18-96	X	X	X	X	X
YOS00101	RA908008		soil	1-18-96	X	X	X	X	X
SOS00101	RA908009		soil	1-18-96	X	X	X	X	X
WOS00101	RA908010		soil	1-18-96	X	X	X	X	X
AOS00101	RA908011		soil	1-18-96	X	X	X	X	X
COS00101MS	RA908004MS	MS	soil	1-18-96	X	X	X	X	X
COS00101MSD	RA908004MSD	MSD	soil	1-18-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table II
Summary of Rejected Data (Organics)
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Fraction	Sample	Compound	Reason
WF006	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBS	All samples	No rejected results	-
WF007	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF008	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF009	Volatiles	All samples	No rejected results	-
	Semivolatiles	15S00201	1,4-Dichlorobenzene	Low MS/MSD recoveries
			1,2,4-Trichlorobenzene	Low MS/MSD recoveries
			Acenaphthene	Low MS/MSD recoveries
			Pyrene	MS/MSD recoveries
	Pesticides & PCBs	All samples	No rejected results	-
WF010	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF11A	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF11B	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF012	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF013	Volatiles	All samples	No rejected results	-
	Semivolatiles	16S00801	All compounds	Low Surrogate recoveries
	Pesticides & PCBs	All samples	No rejected results	-
WF014	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF015	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	COS00101	All compounds	Low Surrogate recoveries
		SOS00101	All compounds	Low Surrogate recoveries

Table III
Summary of Rejected Data (Inorganics)
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes				
SDG	**Fraction**	**Sample**	**Analyte**	**Reason**
WF006	All metals Cyanide TRPH	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF007	All metals Cyanide TRPH	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF008	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF009	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF010	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF11A	All metals Cyanide TRPH	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF11B	All metals Cyanide TRPH	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF012	All metals All TCLP metals Cyanide	All samples All samples All samples	No rejected results No rejected results No rejected results	- -
WF013	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF014	Mercury Cyanide	31B00301 All samples	Mercury No rejected results	Low LCS % Recovery -
WF015	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria % Recovery	Criteria RPD	% Recovery MS	% Recovery MSD	RPD	Qualifier
WF006	02S00401	Volatiles	-	-	-	-	-	None
		Phenol	26-90	-	-	92	-	None
		4-Chloro-3-methylphenol	26-103	-	-	104	-	None
		2,4-Dinitrotoluene	28-89	-	-	100	-	None
		Pyrene	35-142	-	29	30	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF007	10S00101	Volatiles	-	-	-	-	-	None
		4-Chloro-3-methylphenol	26-103	-	111	-	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF008	15S02001	Volatiles	-	-	-	-	-	None
		1,4-Dichlorobenzene	28-104	≤27	-	14	142	None
		1,2,4-Trichlorobenzene	38-107	≤23	-	12	149	None
		Acenaphthene	-	≤19	-	-	96	None
		2,4-Dinitrotoluene	28-89	-	100	94	-	None
		Pyrene	35-142	≤36	-	6	67	None
		Pesticides & PCBs	-	-	-	-	-	None
WF009	15S00101	Volatiles	-	-	-	-	-	None
		2-Chlorophenol	25-102	≤50	16	-	110	None
		1,4-Dichlorobenzene	28-104	-	0	0	-	R
		1,2,4-Trichlorobenzene	38-107	≤23	0	3	200	R
		Acenaphthene	31-137	≤19	0	9	200	R
		Pentachlorophenol	17-109	≤47	10	-	127	None
		Pyrene	35-142	-	0	0	-	R
		Pesticides & PCBs	-	-	-	-	-	None
WF009	15S00101R	2,4-Dinitrotoluene	28-89	-	-	95	-	UJ

Table IV

Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF010	31S01501	Volatiles	-	-	-	-	-	-
		4-Chloro-3-methylphenol	26-103	-	104	-	-	None
		2,4-Dinitrotoluene	28-89	-	94	-	-	None
		Pesticides & PCBs	-	-	-	-	-	-
WF11A	09W00101	Volatiles	-	-	-	-	-	None
		4-Chloro-3-methylphenol	23-97	-	104	107	-	None
		4-Nitrophenol	10-80	-	117	119	-	None
		2,4-Dinitrophenol	24-96	-	106	107	-	None
		Pentachlorophenol	96-103	-	120	119	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF11B	10S00201	Volatiles	-	-	-	-	-	None
		Pyrene	-	≤36	-	-	39	None
		Pesticides & PCBs	-	-	-	-	-	None
WF012	31S00501	Volatiles	-	-	-	-	-	None
		4-Nitrophenol	11-114	-	120	115	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF013	16S01001	Volatiles	-	-	-	-	-	None
		Phenol	26-90	-	-	96	-	U
		2-Chlorophenol	25-102	-	-	103	-	U
		Pentachlorophenol	17-109	-	-	110	-	U
		Pesticides & PCBs	-	-	-	-	-	None
WF014	BKS00201	Volatiles	-	-	-	-	-	None
		Pentachlorophenol	17-109	-	133	136	-	None
		4-Nitrophenol	11-114	-	-	132	-	None
		Pesticides & PCBs	-	-	-	-	-	None

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds								
			Criteria		% Recovery			
SDG	Client ID	Compound	% Recovery	RPD	MS	MSD	RPD	Qualifier
WF015	COS00101	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		Pesticides & PCBs	-	-	-	-	-	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF006	**Client ID**	**02S00401**	**02S00401D**	
	Laboratory ID	**G8864007**	**G8864008**	
	Collection Date	**12/5/95**	**12/5/95**	
	Volatiles	ND	ND	-
	Semivolatiles	ND	ND	-
	Dieldrin	8.3	8.0	4
	Alpha-chlordane	5.6	5.1	9
	Gamma-chlordane	3.5	2.9	19
WF006	**Client ID**	**09S00301**	**09S00301D**	
	Laboratory ID	**G8876010**	**G8876011**	
	Collection Date	**12/6/96**	**12/6/96**	
	Acetone	ND	5 ug/Kg	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF007	**Client ID**	**10S00101**	**10S00101D**	
	Laboratory ID	**G8889002**	**G8889003**	
	Collection Date	**12/7/95**	**12/7/95**	
	Volatiles	ND	ND	-
	Phenanthrene	280 ug/Kg	1200 ug/Kg	124
	Fluoranthene	660 ug/Kg	2300 ug/Kg	111
	Pyrene	580 ug/Kg	1600 ug/Kg	94
	Benzo(a)anthracene	340 ug/Kg	1200 ug/Kg	112
	Chrysene	500 ug/Kg	1400 ug/Kg	120
	Bis(2-ethylhexyl)phthalate	200 ug/Kg	360U ug/Kg	Not calculable
	Benzo(b)fluoranthene	480 ug/Kg	1300 ug/Kg	92
	Benzo(k)fluoranthene	360 ug/Kg	900 ug/Kg	86
	Benzo(a)pyrene	400 ug/Kg	1000 ug/Kg	86
	Indeno(1,2,3-cd)pyrene	180 ug/Kg	360 ug/Kg	67
	Benzo(g,h,i)perylene	180 ug/Kg	340 ug/Kg	62
	Anthracene	370U ug/Kg	270 ug/Kg	Not calculable
	Carbazole	370U ug/Kg	100 ug/Kg	Not calculable
	Dibenz(a,h)anthracene	370U ug/Kg	170 ug/Kg	Not calculable
	Pesticides & PCBs	ND	ND	-
WF007	**Client ID**	**14S00101**	**14S00101D**	
	Laboratory ID	**G8895007**	**G8895008**	
	Collection Date	**12/8/95**	**12/8/95**	
	Acetone	8 ug/Kg	ND	Not calculable
	Methylene chloride	6 ug/Kg	ND	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF008	**Client ID**	**15S02001**	**15S02001D**	
	Laboratory ID	**G8913002**	**G8913003**	
	Collection Date	**12/9/95**	**12/9/95**	
	Acetone	5 ug/Kg	ND	Not calculable
	Methylene chloride	ND	5 ug/Kg	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF008	**Client ID**	**15S01701**	**15S01701D**	
	Laboratory ID	**G8913013**	**G8913014**	
	Collection Date	**12/10/95**	**12/10/95**	
	Acetone	6 ug/Kg	4 ug/Kg	40
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF009	**Client ID**	**15S00101**	**15S00101D**	
	Laboratory ID	**G8914002**	**G8914003**	
	Collection Date	**12/11/95**	**12/11/95**	
	Acetone	6 ug/Kg	7 ug/Kg	15
	Bis(2-ethylhexyl)phthalate	ND	1700 ug/Kg	Not calculable
	Pesticides & PCBs	ND	ND	-
WF010	**Client ID**	**31S01501**	**31S01501D**	
	Laboratory ID	**G8938002**	**G8938003**	
	Collection Date	**12/13/95**	**12/13/95**	
	Acetone	ND	5 ug/Kg	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF11A	**Client ID**	**09W00101**	**09W00101D**	
	Laboratory ID	**RA903001**	**RA903002**	
	Collection Date	**1/5/96**	**1/5/96**	
	Toluene	10U ug/L	1 ug/L	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF11B	**Client ID**	**10S00201**	**10S00201D**	
	Laboratory ID	**RA847002**	**RA847003**	
	Collection Date	**1/5/96**	**1/5/96**	
	Acetone	29 ug/Kg	20 ug/Kg	37
	2-Hexanone	11U ug/Kg	4 ug/Kg	Not calculable
	Phenanthrene	68 ug/Kg	310 ug/Kg	128
	Di-n-butylphthalate	46 ug/Kg	380U ug/Kg	Not calculable
	Fluoranthene	160 ug/Kg	420 ug/Kg	90
	Pyrene	170 ug/Kg	290 ug/Kg	52
	Butylbenzylphthalate	57 ug/Kg	380U ug/Kg	Not calculable
	Benzo(a)anthracene	87 ug/Kg	190 ug/Kg	74
	Chrysene	120 ug/Kg	220 ug/Kg	59
	Bis(2-ethylhexyl)phthalate	3200 ug/Kg	140 ug/Kg	183
	Benzo(a)fluoranthene	150 ug/Kg	200 ug/Kg	28
	Benzo(k)fluoranthene	110 ug/Kg	210 ug/Kg	62
	Benzo(a)pyrene	95 ug/Kg	150 ug/Kg	45
	Indeno(1,2,3-cd)pyrene	58 ug/Kg	56 ug/Kg	4
	Acenaphthene	380U ug/Kg	40 ug/Kg	Not calculable
	Anthracene	380U ug/Kg	54 ug/Kg	Not calculable
	Carbazole	380U ug/Kg	84 ug/Kg	Not calculable
	4,4'-DDT	7.0 ug/Kg	8.9 ug/Kg	24
	Aroclor 1254	340 ug/Kg	390 ug/Kg	14
WF012	**Client ID**	**31S00501**	**31S00501D**	
	Laboratory ID	**RA855011**	**RA855012**	
	Collection Date	**1/7/96**	**1/7/96**	
	Acetone	9 ug/Kg	8 ug/Kg	12
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF013	**Client ID**	**16S00101**	**16S00101D**	
	Laboratory ID	**RA856001**	**RA856018**	
	Collection Date	**1/8/96**	**1/8/96**	
	Acetone	4 ug/Kg	9 ug/Kg	77
	Bis(2-ethylhexyl)phthalate	45 ug/Kg	380U ug/Kg	Not calculable
	4,4'-DDE	3.2 ug/Kg	2.0 ug/Kg	46
	4,4'-DDT	3.8 ug/Kg	2.7 ug/Kg	34
WF013	**Client ID**	**16S01001**	**16S01001D**	
	Laboratory ID	**RA856014**	**RA856015**	
	Collection Date	**1/9/96**	**1/9/96**	
	Acetone	14 ug/Kg	4 ug/Kg	111
	Bis(2-ethylhexyl)phthalate	60 ug/Kg	58 ug/Kg	3
	Dieldrin	33 ug/Kg	60 ug/Kg	58
	4,4'-DDE	13 ug/Kg	22 ug/Kg	51
	4,4'-DDT	6.4 ug/Kg	9.0 ug/Kg	34
	Alpha-chlordane	6.8 ug/Kg	12 ug/Kg	55
	Gamma-chlordane	4.0 ug/Kg	7.9 ug/Kg	66
	Aroclor 1260	48 ug/Kg	110 ug/Kg	78

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF014	**Client ID** **Laboratory ID** **Collection Date**	**BKS00201** **RA870008** **1/10/96**	**BKS00201D** **RA870009** **1/10/96**	
	Acetone	8 ug/Kg	4 ug/Kg	67
	Bis(2-ethylhexyl)phthalate	370U ug/Kg	45 ug/Kg	Not calculable
	Pesticides & PCBs	ND	ND	-
WF014	**Client ID** **Laboratory ID** **Collection Date**	**31B00201** **RA870014** **1/11/96**	**31B00201D** **RA870015** **1/11/96**	
	Acetone	3 ug/Kg	11U ug/Kg	Not calculable
	Bis(2-ethylhexyl)phthalate	370U ug/Kg	48 ug/Kg	Not calculable
	Pesticides & PCBs	ND	ND	-
WF015	**Client ID** **Laboratory ID** **Collection Date**	**COS00101** **RA908004** **1/18/96**	**COS00101D** **RA908005** **1/18/96**	
	Acetone	22 ug/Kg	12U ug/Kg	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-

Table VI
Summary of Surrogate Recoveries
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF006	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
	All samples	Pesticides & PCBs	All within QC limits	-	-	None
WF007	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	10R00101	Decachlorobiphenyl	54	60-150	1	UJ (all compounds)
WF008	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	15S02501	Decachlorobiphenyl	54	60-150	1	UJ (all compounds)
WF009	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
	All samples	Pesticides & PCBs	All within QC limits	-	-	None
WF010	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	31S00101	Tetrachloro-m-xylene	57	60-150	1	UJ/J (all compounds)
		Tetrachloro-m-xylene	56	60-150		

Table VI
Summary of Surrogate Recoveries
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF11A	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	09W00101	Decachlorobiphenyl	56	60-150	3	UJ (all compounds)
		Decachlorobiphenyl	50	60-150		
	09W00101D	Decachlorobiphenyl	58	60-150		UJ (all compounds)
		Decachlorobiphenyl	51	60-150		
	16W00101	Decachlorobiphenyl	45	60-150		UJ (all compounds)
		Decachlorobiphenyl	40	60-150		
WF11B	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	12R00101	Decachlorobiphenyl	33	60-150	4	UJ (all compounds)
		Decachlorobiphenyl	29	60-150		
	10S00201	Decachlorobiphenyl	56	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	55	60-150		
	10S00301	Decachlorobiphenyl	45	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	42	60-150		
	11S00201	Decachlorobiphenyl	50	60-150		UJ/J (all compounds)
WF012	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs	54	60-150	4	UJ (all compounds)
	31R00201	Decachlorobiphenyl	43	60-150		
	31S00901	Decachlorobiphenyl	45	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	40	60-150		
	31S01201	Decachlorobiphenyl	48	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	50	60-150		
	31S01301	Decachlorobiphenyl	46	60-150		UJ (all compounds)

Table VI
Summary of Surrogate Recoveries
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF013	All samples	Volatiles	All within QC limits	-	-	None
		Semivolatiles				
	16S00801	Nitrobenzene-d5	3	23-120	1	R
		2-Fluorobiphenyl	3	30-115		
		Terphenyl-d14	4	18-137		
		Phenol-d5	2	24-113		
		2-Fluorophenol	2	25-121		
		2,4,6-Tribromophenol	3	19-122		
		2-Chlorophenol-d4	3	20-130		
		1,2-Dichlorobenzene-d4	2	20-130		
		Pesticides & PCBs				
	16R00101	Decachlorobiphenyl	58	60-150	8	UJ (all compounds)
	16S00101D	Tetrachloro-m-xylene	22	60-150		UJ/J (all compounds)
		Tetrachloro-m-xylene	21	60-150		
	16S00301	Tetrachloro-m-xylene	57	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	57	60-150		
		Decachlorobiphenyl	54	60-150		
	16S01001	Decachlorobiphenyl	44	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	41	60-150		
	16S01201	Tetrachloro-m-xylene	55	60-150		UJ/J (all compounds)
	16S01301	Decachlorobiphenyl	55	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	55	60-150		
	24S00101	Tetrachloro-m-xylene	48	60-150		UJ (all compounds)
		Tetrachloro-m-xylene	46	60-150		
		Decachlorobiphenyl	41	60-150		
		Decachlorobiphenyl	43	60-150		
	BKS00101	Tetrachloro-m-xylene	56	60-150		UJ (all compounds)
WF014	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	BKR00101	Decachlorobiphenyl	43	60-150	1	UJ (all compounds)
		Decachlorobiphenyl	39	60-150		

Table VI
Summary of Surrogate Recoveries
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF015	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		<u>Pesticides & PCBs</u>				
	COR00101	Decachlorobiphenyl	55	60-150	5	UJ (all compounds)
	AOS00101	Tetrachloro-m-xylene	55	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	51	60-150		
		Decachlorobiphenyl	48	60-150		UJ (all compounds
	COS00101D	Tetrachloro-m-xylene	26	60-150		
		Tetrachloro-m-xylene	24	60-150		UJ/J (all compounds)
	WOS00101	Tetrachloro-m-xylene	39	60-150		
		Tetrachloro-m-xylene	37	60-150		
		Decachlorobiphenyl	41	60-150		
		Decachlorobiphenyl	43	60-150		
	YOS00101	Tetrachloro-m-xylene	37	60-150		UJ (all compounds)
		Tetrachloro-m-xylene	36	60-150		
	COS00101	Tetrachloro-m-xylene	7	60-150	2	R (ND compounds)
		Tetrachloro-m-xylene	7	60-150		
	SOS00101	Tetrachloro-m-xylene	2	60-150		R (ND compounds)
		Tetrachloro-m-xylene	1	60-150		
		Decachlorobiphenyl	15	60-150		
		Decachlorobiphenyl	16	60-150		

Notes: J = estimated value
UJ = undetected, but number that is reported as the quantification limit is an estimated value.

Table VII
Summary of Compounds Exceeding Instrument Calibration
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF006	All	Volatiles	-	-	None
	12/7/96	2,4-Dinitrophenol	-	33.1	UJ
	12/8/96	2,4-Dinitrophenol	-	27.0	UJ
	12/11/96	Diethylphthalate	-	30.1	UJ
	12/12/96	Diethylphthalate	-	27.1	UJ
	11/30/95	Alpha-BHC	21.7	-	UJ
	11/30/95	Alpha-BHC	20.3	-	UJ
WF007	All	Volatiles	-	-	None
	12/12/96	Dimethylphthalate	-	27.1	UJ
	12/15/96	Nitrobenzene	-	25.6	UJ
		Pentachlorophenol	-	29.6	UJ
	12/15/96	Nitrobenzene	-	30.8	UJ
		2,4-Dinitrophenol	-	41.8	UJ
		4,6-Dinitro-2-methylphenol	-	30.1	UJ
		Pentachlorophenol	-	29.8	UJ
		Benzo(k)fluoranthene	-	26.5	UJ/J
	All	Pesticides & PCBs	-	-	None
WF008	All	Volatiles	-	-	None
	12/15/95	Nitrobenzene	-	25.6	UJ
		Pentachlorophenol	-	29.6	UJ
	12/31/95	2,4-Dinitrophenol	-	42.0	UJ
		4-Nitrophenol	-	27.3	UJ
		Pentachlorophenol	-	34.8	UJ
		3,3'-Dichlorobenzidine	-	25.9	UJ
		Benzo(b)fluoranthene	-	27.7	UJ
	11/30/95	Alpha-BHC	21.7	-	UJ
	11/30/95	Alpha-BHC	20.3	-	UJ
WF009	All	Volatiles	-	-	None
	12/15/95	Nitrobenzene	-	25.6	UJ
		Pentachlorophenol	-	29.6	UJ
	12/31/95	2,4-Dinitrophenol	-	42.0	UJ
		4-Nitrophenol	-	27.3	UJ
		Pentachlorophenol	-	34.8	UJ
		3,3'-Dichlorobenzidine	-	25.9	UJ
		Benzo(b)fluoranthene	-	27.7	UJ
	All	Pesticides & PCBs	-	-	None

Table VII
Summary of Compounds Exceeding Instrument Calibration
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF010	All	Volatiles	-	-	None
	12/27/95	4-Nitrophenol	-	28.1	UJ
		Benzo(b)fluoranthene	-	31.4	UJ
		Indeno(1,2,3-cd)pyrene	-	32.8	UJ
	11/30/95	Alpha-BHC	21.7	-	UJ
	11/30/95	Alpha-BHC	20.3	-	UJ
WF11A	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
	1/10/96	Endosulfan I	22	-	UJ
WF11B	1/10/96	Acetone	-	40.0	UJ/J
		2-Butanone	-	37.3	UJ
		4-Methyl-2-pentanone	-	37.7	UJ
		2-Hexanone	-	41.0	UJ/J
	1/11/96	Trichloroethene	-	27.7	UJ
		2-Hexanone	-	50.9	UJ/J
		1,1,2,2-Tetrachloroethane	-	34.2	UJ
	1/12/96	2-Hexanone	-	48.4	UJ/J
	1/10/96	Endosulfan I	22	-	UJ
WF012	1/11/96	Trichloroethene	-	27.7	UJ
		2-Hexanone	-	50.9	UJ
		1,1,2,2-Tetrachloroethane	-	34.2	UJ
	1/12/96	2-Hexanone	-	48.4	UJ
	1/13/96	Chloromethane	-	27.2	UJ
		Vinyl chloride	-	27.2	UJ
		Acetone	-	68.1	UJ/J
		2-Butanone	-	69.9	UJ
		1,2-Dichloroethane	-	29.6	UJ
		4-Methyl-2-pentanone	-	31.4	UJ
	1/15/96	Chloroethane	-	26.3	UJ
		Acetone	-	51.7	UJ/J
		2-Butanone	-	40.8	UJ
		1,2-Dichloroethane	-	35.4	UJ
	All	Semivolatiles	-	-	None
	1/17/96	Endosulfan sulfate	24.0	-	UJ

Table VII
Summary of Compounds Exceeding Instrument Calibration
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds					
SDG	**Date**	**Compound**	**Criteria**		**Qualifier**
			Initial Calibration %RSD	**Continuing Calibration %D**	
WF013	1/15/96	1,1-Dichloroethene	33.9	-	UJ
		Carbon disulfide	32.8	-	UJ
	1/17/96	2-Hexanone	41.7	-	UJ
	1/13/96	Chloromethane	-	27.2	UJ
		Vinyl chloride	-	27.2	UJ
		Acetone	-	68.1	UJ/J
		2-Butanone	-	69.9	UJ
		1,2-Dichloroethane	-	29.6	UJ
		4-Methyl-2-pentanone	-	31.4	UJ
	1/15/96	Chloroethane	-	26.3	UJ
		Acetone	-	51.7	UJ/J
		2-Butanone	-	40.8	UJ
		1,2-Dichloroethane	-	35.4	UJ
	1/18/96	2-Hexanone	-	27.5	UJ
	1/22/96	Chloromethane	-	41.8	UJ
		Vinyl chloride	-	37.1	UJ
		Chloroethane	-	41.7	UJ
		Acetone	-	31.7	UJ/J
		Carbon disulfide	-	25.8	UJ
		2-Hexanone	-	38.4	UJ
	1/19/96	Benzo(g,h,i)perylene	-	29.0	UJ/J
	1/17/96	Endosulfan sulfate	24.0	-	UJ
WF014	1/15/96	1,1-Dichloroethene	33.9	-	UJ
		Carbon disulfide	32.8	-	UJ
	1/14/96	Acetone	31.3	-	UJ/J
	1/16/96	Acetone	-	46.7	UJ/J
		Methylene chloride	-	32.3	UJ
		2-Butanone	-	54.2	UJ
		4-Methyl-2-pentanone	-	31.9	UJ
		2-Hexanone	-	60.0	UJ
	1/12/96	Acetone	-	36.7	UJ/J
	1/20/96	Benzo(k)fluoranthene	-	30.7	UJ/J
	1/31/96	4-Nitrophenol	-	38.2	UJ
		4-Nitroaniline	-	27.9	UJ
		Pentachlorophenol	-	29.4	UJ
		Benzo(g,h,i)perylene	-	35.3	UJ/J
	1/17/96	Endosulfan sulfate	24.0	-	UJ

Table VII
Summary of Compounds Exceeding Instrument Calibration
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF015	1/17/96	2-Hexanone	41.7	-	UJ
	1/19/96	Chloromethane	-	47.1	UJ
		Vinyl chloride	-	39.0	UJ
		Chloroethane	-	54.7	UJ
		Acetone	-	25.8	UJ/J
		Carbon disulfide	-	45.5	UJ
	1/31/96	4-Nitroaniline	-	27.9	UJ
		Pentachlorophenol	-	29.4	UJ
		Benzo(g,h,i)perylene	-	35.3	UJ
	2/2/96	2-Chlorophenol	-	26.6	UJ
		2-Nitroaniline	-	25.1	UJ
		2,4-Dinitrophenol	-	25.7	UJ
		4-Bromophenyl-phenylether	-	27.2	UJ
		Hexachlorobenzene	-	35.4	UJ
	2/1/96	4-Bromophenyl-phenylether	-	28.4	UJ
		Hexachlorobenzene	-	35.0	UJ
	1/30/96	Endosulfan sulfate	21.0	-	UJ

Notes: %RSD = percent Relative Standard Deviation for initial calibrations

%D = percent Difference for continuing calibrations

J = the compound was positively identified; the associated numerical value is the approximate concentration of the compound in the sample, either because its concentration was lower than the QL (laboratory "J" flag), or because QC criteria were not met (validation "J").

UJ = the compound was not detected above the reported sample QL. However, the reported sample QL is approximate; the compound concentration may not reliably be presumed to be less than the QL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the compound cannot be verified.

Table VIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF006	Volatiles	ND	All samples in SDG WF006
	Pesticides & PCBs	ND	All samples in SDG WF006
	Diethylphthalate	4 ug/L	01R00101 01F00101
	Diethylphthalate	150 ug/Kg	02S00101 02S00201 02S00301 02S00501 09S00101 09S00201 09S00401 09S00501
WF007	Volatiles	ND	All samples in SDG WF007
	Pesticides & PCBs	ND	All samples in SDG WF007
	Diethylphthalate	2 ug/L	10R00101
	Di-n-octylphthalate	230 ug/Kg	13S00101 13S00301 13S00401 13S00501 14S00101D 14S00301
	Di-n-octylphthalate	180 ug/Kg	13S00201 14S00101
WF008	Volatiles	ND	All samples in SDG WF008
	Pesticides & PCBs	ND	All samples in SDG WF008
	Di-n-butylphthalate	280 ug/Kg	15S02001D 15S02101 15S02201 15S01701 15S01701D
WF009	Volatiles	ND	All samples in SDG WF009
	Semivolatiles	ND	All samples in SDG WF009
	Pesticides & PCBs	ND	All samples in SDG WF009
WF010	Volatiles	ND	All samples in SDG WF010
	Di-n-butylphthalate	320 ug/Kg	31S00101 31S00201 31S00301 31S01401 31S01501 31S01501D 31S01601 31S01701 31S01801 31S01901
	Pesticides & PCBs	ND	All samples in SDG WF010

Table VIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	**Compound**	**Concentration**	**Associated Samples**
WF11A	Volatiles	ND	All samples in SDG WF11A
	Bis(2-ethylhexyl)phthalate	3 ug/L	09W00101 09W00101D 16W00101
	Pesticides & PCBs	ND	All samples in SDG WF11A
WF11B	Styrene Xylenes (total)	1 ug/L 2 ug/L	11T00101
	Acetone	7 ug/Kg	10S00301 10S00501 11S00101 11S00201 12S00201 12S00401 12S00501
	Acetone	4 ug/Kg	11S00201R 11S00301 11S00401 11S00501
	Bis(2-ethylhexyl)phthalate	3 ug/L	12R00101
	Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	69 ug/Kg 37 ug/Kg	10S00301 10S00501 12S00201
	Di-n-butylphthalate	100 ug/Kg	10S00201 10S00201DL 10S00201D 10S00301R 12S00401 12S00501 11S00101
	Pesticides & PCBs	ND	All samples in SDG WF11B
WF012	Xylenes (total) Styrene	2 ug/L 1 ug/L	31R00201
	Acetone	7 ug/Kg	31S00801 31S01201
	Acetone	4 ug/Kg	31S00401 31S00501 31S00501D 31S01201R
	Semivolatiles Pesticides & PCBs	ND ND	All samples in SDG WF12 All samples in SDG WF12
WF013	Xylenes (total) Styrene	2 ug/L 1 ug/L	16T00101 16R00101 24T00101

Table VIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF013	Bis(2-ethylhexyl)phthalate	34 ug/Kg	16S00101 16S00501 16S00401 16S00901
	Bis(2-ethylhexyl)phthalate	46 ug/Kg	16S00901R 16S00201
	Bis(2-ethylhexyl)phthalate	76 ug/Kg	16S00301 16S00801 16S00601 16S00601DL 16S01201 16S01301 BKS00301 16S01001
	Pesticides & PCBs	ND	All samples in SDG WF13
WF014	Toluene	1 ug/Kg	31B00301
	Bis(2-ethylhexyl)phthalate	38 ug/Kg	31B00501
	Pesticides & PCBs	ND	All samples in SDG WF14
WF015	Volatiles	ND	All samples in SDG WF15
	Pesticides & PCBs	ND	All samples in SDG WF15
	Bis(2-ethylhexyl)phthalate	1 ug/L	COR00101 COF00101

Table IX
Summary of Field Blank Contamination

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF006	**Client ID:**	**01T00101**		
	Laboratory ID:	**G8864001**		
	Collection Date:	**12/5/95**		
	Type:	**Trip Blank**		
	Acetone		9 ug/L	None
WF006	**Client ID:**	**02T00101**		
	Laboratory ID:	**G8876001**		
	Collection Date:	**12/6/95**		
	Type:	**Trip Blank**		
	Acetone		7 ug/L	None
WF006	**Client ID:**	**01R00101**		
	Laboratory ID:	**G8876012**		
	Collection Date:	**12/6/95**		
	Type:	**Rinsate**		
	Acetone		11 ug/L	None
	Di-n-butylphthalate		8 ug/L	None
	Bis(2-ethyhexyl)phthalate		2 ug/L	None
	Pesticides & PCBs		ND	None
WF006	**Client ID:**	**01F00101**		
	Laboratory ID:	**G8776013**		
	Collection Date:	**12/6/95**		
	Type:	**Source Blank**		
	Acetone		12 ug/L	None
	2-Butanone		2 ug/L	None
	Di-n-butylphthalate		15 ug/L	None
	Pesticides & PCBs		ND	None
WF007	**Client ID:**	**10T00101**		
	Laboratory ID:	**G8889001**		
	Collection Date:	**12/7/95**		
	Type:	**Trip Blank**		
	Acetone		8 ug/L	None
WF007	**Client ID:**	**13T00101**		
	Laboratory ID:	**G8895001**		
	Collection Date:	**12/8/95**		
	Type:	**Trip Blank**		
	Acetone		4 ug/L	None
WF007	**Client ID:**	**10R00101**		
	Laboratory ID:	**G8889009**		
	Collection Date:	**12/7/95**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Di-n-butylphthalate		15 ug/L	10U ug/L[1]
	Pesticides & PCBs		ND	None

Table IX
Summary of Field Blank Contamination

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF008	**Client ID:** 15T00101 **Laboratory ID:** G8913001 **Collection Date:** 12/9/95 **Type:** Trip Blank		
	Acetone	8 ug/L	None
WF008	**Client ID:** 15R00101 **Laboratory ID:** G8913020 **Collection Date:** 12/11/95 **Type:** Rinsate		
	Volatiles	ND	None
	Di-n-butylphthalate	3 ug/L	10U ug/L[1]
	Pesticides & PCBs	ND	None
WF009	**Client ID:** 15T00201 **Laboratory ID:** G8914001 **Collection Date:** 12/11/95 **Trip Blank:** Trip Blank		
	Acetone	19 ug/L	None
WF009	**Client ID:** 15R00201 **Laboratory ID:** G8914012 **Collection Date:** 12/11/95 **Type:** Rinsate		
	Acetone	12 ug/L	None
	Di-n-butylphthalate	4 ug/L	10U ug/L[1]
	Pesticides & PCBs	ND	None
WF010	**Client ID:** 31T00101 **Laboratory ID:** G8924005 **Collection Date:** 12/12/95 **Type:** Trip Blank		
	Acetone	10 ug/L	None
WF010	**Client ID:** 31T00201 **Laboratory ID:** G8938001 **Collection Date:** 12/13/95 **Type:** Trip Blank		
	Acetone	12 ug/L	None
WF010	**Client ID:** 31R00101 **Laboratory ID:** G8924006 **Collection Date:** 12/12/965 **Type:** Rinsate		
	Volatiles	ND	None
	Di-n-butylphthalate	7 ug/L	10U ug/L[1]
	Pesticides & PCBs	ND	None

Table IX
Summary of Field Blank Contamination

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF11B	**Client ID:**	**12R00101**		
	Laboratory ID:	**RA847012**		
	Collection Date:	**1/5/96**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Di-n-butylphthalate		4 ug/L	None
	Pesticides &PCBs		ND	None
WF11B	**Client ID:**	**12T00101**		
	Laboratory ID:	**RA847001**		
	Collection Date:	**1/5/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF11B	**Client ID:**	**11T00101**		
	Laboratory ID:	**RA847013**		
	Collection Date:	**1/6/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF012	**Client ID:**	**31R00201**		
	Laboratory ID:	**RA855021**		
	Collection Date:	**1/8/96**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Semivolatiles		ND	None
	Pesticides & PCBs		ND	None
WF013	**Client ID:**	**16T00101**		
	Laboratory ID:	**RA856016**		
	Collection Date:	**1/9/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF013	**Client ID:**	**24T00101**		
	Laboratory ID:	**RA871001**		
	Collection Date:	**1/10/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF013	**Client ID:**	**16R00101**		
	Laboratory ID:	**RA856017**		
	Collection Date:	**1/9/96**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Di-n-butylphthalate		5 ug/L	10U ug/L[1]
	Pesticides & PCBs		ND	None

Table IX
Summary of Field Blank Contamination

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF014	**Client ID:**	**BKT00101**		
	Laboratory ID:	**RA870002**		
	Collection Date:	**1/10/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF014	**Client ID:**	**31T00201**		
	Laboratory ID:	**RA870018**		
	Collection Date:	**1/11/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF014	**Client ID:**	**BKR00101**		
	Laboratory ID:	**RA870001**		
	Collection Date:	**1/10/96**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Di-n-butylphthalate		5 ug/L	10U ug/L[1]
	Pesticides & PCBs		ND	None
WF015	**Client ID:**	**COT00101**		
	Laboratory ID:	**RA908003**		
	Collection Date:	**1/18/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF015	**Client ID:**	**COR00101**		
	Laboratory ID:	**RA908001**		
	Collection Date:	**1/18/96**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Di-n-butylphthalate		5 ug/L	10U ug/L[1]
	Pesticides & PCBs		ND	None
WF015	**Client ID:**	**COF00101**		
	Laboratory ID:	**RA908002**		
	Collection Date:	**1/18/96**		
	Type:	**Source Blank**		
	Volatiles		ND	None
	Di-n-butylphthalate		7 ug/L	None
	Pesticides & PCBs		ND	None

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

Table X
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Client ID	Analyte	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF006	02S00401	Calcium	-	±2205 mg/Kg	-	-	9780 mg/Kg	J
		Nickel	-	±17.6 mg/Kg	-	-	40.8 mg/Kg	J
		Antimony	75-125	-	73.8	-	-	J
		Manganese	75-125	-	73.8	-	-	J
		Cyanide	-	-	-	-	-	None
		TRPH	-	-	-	-	-	None
WF007	10S00101	Antimony	75-125	-	65.6	-	-	J
		Barium	75-125	±88.10 mg/Kg	171.0	-	1221 mg/Kg	J
		Manganese	75-125	±6.6 mg/Kg	130.0	-	34.30 mg/Kg	J
		Lead	75-125	-	128.7	-	-	J
		Selenium	75-125	-	56.1	-	-	J
		Cyanide	-	-	-	-	-	None
		TRPH	-	-	-	-	-	None
WF008	15S02001	Antimony	75-125	-	68.2	-	-	J
		Mercury	75-125	-	125.3	-	-	J
		Cyanide	-	-	-	-	-	None
WF009	15S00101	Antimony	75-125	-	53.5	-	-	J
WF010	31S01501	Antimony	75-125	-	73.8	-	-	None
		Cyanide	-	-	-	-	-	None
WF11A	09W00101	All metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
		TRPH	-	-	-	-	-	None
WF11B	10S00201	All metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
		TRPH	-	-	-	-	-	None

Table X

Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Client ID	Analyte	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF012	31S00501	All metals	-	-	-	-	-	None
		All TCLP metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF013	16S01001	Aluminum	-	≤35	-	-	71.0	J
		Iron	-	≤35	-	-	42.3	J
		Lead	75-125	-	127	-	-	J
		Cyanide	-	-	-	-	-	None
WF014	BKS00201	Aluminum	-	≤35	-	-	35.6	J
		Cyanide	-	-	-	-	-	None
WF015	COS00101	Lead	75-125	-	-46.5	-	-	J
		Cyanide	-	-	-	-	-	None

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF006	**Client ID**	**02S00401**	**02S00401D**	
	Laboratory ID	**G8864007**	**G8864008**	
	Collection Date	**12/5/95**	**12/5/95**	
	Aluminum	9580 mg/Kg	7580 mg/Kg	23
	Arsenic	3.9 mg/Kg	4.0 mg/Kg	3
	Barium	27.7 mg/Kg	15.9 mg/Kg	54
	Beryllium	0.31 mg/Kg	0.13 mg/Kg	81
	Calcium	14900 mg/Kg	9900 mg/Kg	40
	Chromium	13.6 mg/Kg	14.0 mg/Kg	3
	Cobalt	0.53 mg/Kg	ND	Not calculable
	Copper	4.3 mg/Kg	3.8 mg/Kg	12
	Iron	4010 mg/Kg	3880 mg/Kg	3
	Lead	10.9 mg/Kg	11.6 mg/Kg	6
	Magnesium	926 mg/Kg	403 mg/Kg	79
	Manganese	188 mg/Kg	164 mg/Kg	14
	Mercury	0.03 mg/Kg	0.05 mg/Kg	50
	Nickel	3.9 mg/Kg	3.8 mg/Kg	1
	Potassium	377 mg/Kg	142 mg/Kg	91
	Sodium	104 mg/Kg	70.2 mg/Kg	38
	Vanadium	12.9 mg/Kg	11.7 mg/Kg	10
	Zinc	13.1 mg/Kg	12.5 mg/Kg	5
	Cyanide	0.15 mg/Kg	ND	Not calculable
WF006	**Client ID**	**09S00301**	**09S00301D**	
	Laboratory ID	**G8876010**	**G8876011**	
	Collection Date	**12/6/96**	**12/6/96**	
	Aluminum	25200 mg/Kg	33100 mg/Kg	27
	Arsenic	8.5 mg/Kg	7.1 mg/Kg	18
	Barium	8.9 mg/Kg	21.7 mg/Kg	83
	Beryllium	0.12 mg/Kg	0.22 mg/Kg	59
	Calcium	176 mg/Kg	384 mg/Kg	74
	Chromium	21.7 mg/Kg	29.5 mg/Kg	30
	Cobalt	0.52 mg/Kg	0.55 mg/Kg	6
	Copper	6.8 mg/Kg	9.0 mg/Kg	28
	Iron	17800 mg/Kg	26500 mg/Kg	40
	Lead	11.2 mg/Kg	6.6 mg/Kg	52
	Magnesium	143 mg/Kg	227 mg/Kg	45
	Manganese	28.2 mg/Kg	52.9 mg/Kg	61
	Mercury	0.01 mg/Kg	0.01 mg/Kg	0
	Nickel	ND	6.1 mg/Kg	Not calculable
	Potassium	ND	212 mg/Kg	Not calculable
	Selenium	0.33 mg/Kg	ND	Not calculable
	Sodium	8.4 mg/Kg	10.4 mg/Kg	21
	Vanadium	43.5 mg/Kg	65.1 mg/Kg	40
	Zinc	6.3 mg/Kg	14.4 mg/Kg	78
	Cyanide	ND	ND	-
	TRPH	ND	ND	-

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF007	**Client ID**	**10S00101**	**10S00101D**	
	Laboratory ID	**G8889002**	**G8889003**	
	Collection Date	**12/7/95**	**12/7/95**	
	Aluminum	8760 mg/Kg	8920 mg/Kg	2
	Arsenic	2.5 mg/Kg	2.6 mg/Kg	4
	Barium	361 mg/Kg	1320 mg/Kg	114
	Beryllium	0.13 mg/Kg	0.13 mg/Kg	0
	Cadmium	0.91 mg/Kg	ND	Not calculable
	Calcium	23200 mg/Kg	17800 mg/Kg	26
	Chromium	18.2 mg/Kg	16.8 mg/Kg	8
	Cobalt	0.83 mg/Kg	2.0 mg/Kg	82
	Copper	7.9 mg/Kg	7.9 mg/Kg	0
	Iron	6520 mg/Kg	6780 mg/Kg	4
	Lead	38.0 mg/Kg	33.1 mg/Kg	14
	Magnesium	5910 mg/Kg	5600 mg/Kg	5
	Manganese	56.6 mg/Kg	66.0 mg/Kg	15
	Mercury	0.07 mg/Kg	0.07 mg/Kg	0
	Nickel	6.8 mg/Kg	3.0 mg/Kg	77
	Potassium	219 mg/Kg	ND	Not calculable
	Sodium	35.6 mg/Kg	46.2 mg/Kg	26
	Vanadium	18.9 mg/Kg	18.7 mg/Kg	1
	Zinc	37.7 mg/Kg	34.1 mg/Kg	5
	Cyanide	0.10 mg/Kg	0.20 mg/Kg	67
	TRPH	240 mg/Kg	180 mg/Kg	29
WF007	**Client ID**	**14S00101**	**14S00101D**	
	Laboratory ID	**G8895007**	**G8895008**	
	Collection Date	**12/8/95**	**12/8/95**	
	Aluminum	11600 mg/Kg	11500 mg/Kg	1
	Arsenic	1.5 mg/Kg	1.9 mg/Kg	23
	Barium	23.3 mg/Kg	26.6 mg/Kg	13
	Beryllium	0.15 mg/Kg	0.16 mg/Kg	6
	Calcium	120 mg/Kg	183 mg/Kg	6
	Chromium	7.8 mg/Kg	7.8 mg/Kg	0
	Cobalt	1.8 mg/Kg	1.6 mg/Kg	12
	Copper	3.8 mg/Kg	4.3 mg/Kg	12
	Iron	6310 mg/Kg	6630 mg/Kg	5
	Lead	7.7 mg/Kg	11.9 mg/Kg	42
	Magnesium	177 mg/Kg	162 mg/Kg	9
	Manganese	521 mg/Kg	597 mg/Kg	14
	Mercury	0.04 mg/Kg	0.04 mg/Kg	0
	Nickel	4.1 mg/Kg	4.6 mg/Kg	12
	Potassium	144 mg/Kg	ND	Not calculable
	Sodium	16.4 mg/Kg	14.0 mg/Kg	16
	Vanadium	16.8 mg/Kg	17.4 mg/Kg	6
	Zinc	6.0 mg/Kg	6.6 mg/Kg	10
	Cyanide	0.07 mg/Kg	ND	Not calculable

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF008	**Client ID**	**15S02001**	**15S02001D**	
	Laboratory ID	**G8913002**	**G8913003**	
	Collection Date	**12/9/95**	**12/9/95**	
	Aluminum	4630 mg/Kg	5470 mg/Kg	17
	Arsenic	1.2 mg/Kg	1.1 mg/Kg	9
	Barium	5.6 mg/Kg	6.6 mg/Kg	16
	Beryllium	0.13 mg/Kg	0.13 mg/Kg	0
	Calcium	22.2 mg/Kg	25.2 mg/Kg	13
	Chromium	3.0 mg/Kg	3.7 mg/Kg	21
	Copper	1.9 mg/Kg	2.4 mg/Kg	23
	Iron	2500 mg/Kg	2950 mg/Kg	17
	Lead	5.9 mg/Kg	5.9 mg/Kg	0
	Magnesium	85.0 mg/Kg	107 mg/Kg	23
	Manganese	75.2 mg/Kg	87.1 mg/Kg	15
	Mercury	0.02 mg/Kg	0.02 mg/Kg	0
	Nickel	2.4 mg/Kg	9.1 mg/Kg	117
	Selenium	0.26 mg/Kg	ND	Not calculable
	Vanadium	5.7 mg/Kg	7.1 mg/Kg	22
	Zinc	3.0 mg/Kg	4.1 mg/Kg	31
	Cyanide	ND	ND	-
WF008	**Client ID**	**15S01701**	**15S01701D**	
	Laboratory ID	**G8913013**	**G8913014**	
	Collection Date	**12/10/95**	**12/10/95**	
	Aluminum	13700 mg/Kg	9290 mg/Kg	38
	Arsenic	3.7 mg/Kg	4.3 mg/Kg	15
	Barium	4.4 mg/Kg	3.8 mg/Kg	15
	Beryllium	0.11 mg/Kg	0.11 mg/Kg	0
	Calcium	23.7 mg/Kg	20.4 mg/Kg	15
	Chromium	14.8 mg/Kg	14.0 mg/Kg	6
	Copper	2.6 mg/Kg	2.5 mg/Kg	4
	Iron	11900 mg/Kg	10400 mg/Kg	13
	Lead	4.7 mg/Kg	4.1 mg/Kg	14
	Magnesium	51.2 mg/Kg	41.8 mg/Kg	20
	Manganese	10.8 mg/Kg	6.8 mg/Kg	45
	Nickel	ND	3.0 mg/Kg	Not calculable
	Selenium	ND	0.25 mg/Kg	Not calculable
	Vanadium	35.9 mg/Kg	31.8 mg/Kg	12
	Zinc	1.5 mg/Kg	1.1 mg/Kg	31
	Cyanide	ND	ND	-

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF009	**Client ID**	**15S00101**	**15S00101D**	
	Laboratory ID	**G8914002**	**G8914003**	
	Collection Date	**12/11/95**	**12/11/95**	
	Aluminum	9280 mg/Kg	10800 mg/Kg	15
	Arsenic	2.0 mg/Kg	1.9 mg/Kg	5
	Barium	6.6 mg/Kg	7.8 mg/Kg	17
	Beryllium	0.12 mg/Kg	0.13 mg/Kg	8
	Calcium	21.6 mg/Kg	23.9 mg/Kg	10
	Chromium	8.4 mg/Kg	8.0 mg/Kg	5
	Copper	3.4 mg/Kg	3.9 mg/Kg	14
	Iron	5120 mg/Kg	5700 mg/Kg	11
	Lead	4.7 mg/Kg	3.6 mg/Kg	26
	Magnesium	109 mg/Kg	132 mg/Kg	19
	Manganese	36.4 mg/Kg	39.9 mg/Kg	9
	Mercury	0.02 mg/Kg	0.02 mg/Kg	0
	Nickel	5.0 mg/Kg	2.4 mg/Kg	70
	Potassium	169 mg/Kg	ND	Not calculable
	Vanadium	13.3 mg/Kg	15.1 mg/Kg	13
	Zinc	4.1 mg/Kg	5.0 mg/Kg	22
	Cyanide	ND	ND	-
WF010	**Client ID**	**31S01501**	**31S01501D**	
	Laboratory ID	**G8938002**	**G8938003**	
	Collection Date	**12/13/95**	**12/13/95**	
	Aluminum	9620 mg/Kg	8270 mg/Kg	15
	Arsenic	1.4 mg/Kg	1.9 mg/Kg	30
	Barium	14.6 mg/Kg	12.2 mg/Kg	18
	Beryllium	0.17 mg/Kg	0.15 mg/Kg	13
	Calcium	112 mg/Kg	103 mg/Kg	8
	Chromium	6.7 mg/Kg	6.0 mg/Kg	11
	Cobalt	0.80 mg/Kg	1.2 mg/Kg	40
	Copper	5.5 mg/Kg	4.2 mg/Kg	27
	Iron	4730 mg/Kg	4380 mg/Kg	8
	Lead	5.3 mg/Kg	5.4 mg/Kg	2
	Magnesium	154 mg/Kg	114 mg/Kg	30
	Manganese	183 mg/Kg	172 mg/Kg	6
	Mercury	0.01 mg/Kg	0.01 mg/Kg	0
	Nickel	3.9 mg/Kg	3.4 mg/Kg	13
	Potassium	ND	197 mg/Kg	Not calculable
	Vanadium	12.8 mg/Kg	11.3 mg/Kg	12
	Zinc	6.8 mg/Kg	5.0 mg/Kg	30
	Cyanide	ND	ND	-
WF11A	**Client ID**	**09W00101**	**09W00101D**	
	Laboratory ID	**RA903001**	**RA903002**	
	Collection Date	**1/5/96**	**1/5/96**	
	Aluminum	123 mg/L	129 mg/L	5
	Arsenic	0.60 mg/L	ND	Not calculable
	Barium	1.1 mg/L	1.3 mg/L	17
	Calcium	760 mg/L	726 mg/L	5
	Iron	118 mg/L	105 mg/L	12
	Magnesium	234 mg/L	236 mg/L	1
	Manganese	12.2 mg/L	12.0 mg/L	2
	Potassium	313 mg/L	298 mg/L	2
	Sodium	904 mg/L	893 mg/L	1
	Zinc	5.4 mg/L	3.8 mg/L	34
	Cyanide	ND	ND	-
	TRPH	ND	ND	-

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF11B	**Client ID**	**10S00201**	**10S00201D**	
	Laboratory ID	**RA847002**	**RA847003**	
	Collection Date	**1/5/96**	**1/5/96**	
	Aluminum	8960 mg/Kg	5890 mg/Kg	41
	Arsenic	3.6 mg/Kg	2.4 mg/Kg	40
	Barium	9.2 mg/Kg	8.1 mg/Kg	13
	Beryllium	0.10 mg/Kg	0.06 mg/Kg	50
	Cadmium	1.4 mg/Kg	1.3 mg/Kg	7
	Calcium	1320 mg/Kg	779 mg/Kg	51
	Chromium	16.0 mg/Kg	12.2 mg/Kg	27
	Cobalt	0.79 mg/Kg	0.82 mg/Kg	4
	Copper	10.8 mg/Kg	11.5 mg/Kg	6
	Iron	9660 mg/Kg	8650 mg/Kg	11
	Lead	32.5 mg/Kg	29.0 mg/Kg	11
	Magnesium	200 mg/Kg	100 mg/Kg	66
	Manganese	39.3 mg/Kg	36.4 mg/Kg	8
	Nickel	2.0 mg/Kg	ND	Not calculable
	Potassium	69.4 mg/Kg	ND	Not calculable
	Sodium	181 mg/Kg	192 mg/Kg	6
	Vanadium	24.5 mg/Kg	20.8 mg/Kg	16
	Zinc	50.0 mg/Kg	42.9 mg/Kg	15
	Cyanide	0.20 mg/Kg	0.13 mg/Kg	42
	TRPH	105 mg/Kg	66.1 mg/Kg	46
WF012	**Client ID**	**31S00501**	**31S00501D**	
	Laboratory ID	**RA855011**	**RA855012**	
	Collection Date	**1/7/96**	**1/7/96**	
	Aluminum	4500 mg/Kg	6050 mg/Kg	29
	Arsenic	1.3 mg/Kg	1.2 mg/Kg	8
	Barium	6.6 mg/Kg	8.6 mg/Kg	26
	Calcium	143 mg/Kg	146 mg/Kg	2
	Chromium	2.8 mg/Kg	3.8 mg/Kg	30
	Cobalt	ND	1.2 mg/Kg	Not calculable
	Copper	2.2 mg/Kg	3.0 mg/Kg	31
	Iron	2470 mg/Kg	2840 mg/Kg	14
	Lead	3.2 mg/Kg	2.9 mg/Kg	10
	Magnesium	80.1 mg/Kg	138 mg/Kg	53
	Manganese	87.0 mg/Kg	95.3 mg/Kg	9
	Nickel	1.9 mg/Kg	2.2 mg/Kg	15
	Potassium	81.9 mg/Kg	115 mg/Kg	34
	Selenium	0.18 mg/Kg	ND	Not calculable
	Sodium	192 mg/Kg	175 mg/Kg	9
	Vanadium	5.9 mg/Kg	7.2 mg/Kg	20
	Zinc	3.9 mg/Kg	5.2 mg/Kg	28
	Barium, TCLP	0.393 mg/L	0.574 mg/L	37
	Chromium, TCLP	0.0017U mg/L	0.0018 mg/L	Not calculable
	Selenium, TCLP	0.0217U mg/L	0.2351 mg/L	Not calculable
	Cyanide	0.09 mg/Kg	ND	Not calculable
WF012	**Client ID**	**11S00601**	**11S00601D**	
	Laboratory ID	**RA855001**	**RA855002**	
	Collection Date	**1/7/96**	**11/7/96**	
	Lead	19.3 mg/Kg	25.0 mg/Kg	26

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF013	**Client ID**	**16S00101**	**16S00101D**	
	Laboratory ID	**RA856001**	**RA856018**	
	Collection Date	**1/8/96**	**1/8/96**	
	Aluminum	4250 mg/Kg	5480 mg/Kg	25
	Arsenic	0.94 mg/Kg	1.2 mg/Kg	24
	Barium	13.2 mg/Kg	13.6 mg/Kg	3
	Beryllium	0.09 mg/Kg	ND	Not calculable
	Cadmium	0.28 mg/Kg	0.30 mg/Kg	7
	Calcium	210 mg/Kg	173 mg/Kg	19
	Chromium	4.0 mg/Kg	5.8 mg/Kg	37
	Copper	4.8 mg/Kg	3.0 mg/Kg	46
	Iron	2340 mg/Kg	2910 mg/Kg	22
	Lead	7.8 mg/Kg	7.5 mg/Kg	4
	Magnesium	103 mg/Kg	150 mg/Kg	37
	Manganese	185 mg/Kg	151 mg/Kg	20
	Nickel	ND	1.9 mg/Kg	Not calculable
	Potassium	99.6 mg/Kg	141 mg/Kg	34
	Selenium	0.19 mg/Kg	ND	Not calculable
	Sodium	129 mg/Kg	108 mg/Kg	18
	Vanadium	6.8 mg/Kg	8.6 mg/Kg	23
	Zinc	6.4 mg/Kg	6.9 mg/Kg	8
	Cyanide	0.12 mg/Kg	0.12 mg/Kg	0
WF013	**Client ID**	**16S01001**	**16S01001D**	
	Laboratory ID	**RA856014**	**RA856015**	
	Collection Date	**1/9/96**	**1/9/96**	
	Aluminum	2000 mg/Kg	1780 mg/Kg	12
	Arsenic	0.76 mg/Kg	0.64 mg/Kg	17
	Barium	4.9 mg/Kg	4.0 mg/Kg	20
	Cadmium	ND	0.23 mg/Kg	Not calculable
	Calcium	101 mg/Kg	99.8 mg/Kg	1
	Chromium	3.9 mg/Kg	3.3 mg/Kg	16
	Copper	10.2 mg/Kg	8.6 mg/Kg	17
	Iron	1470 mg/Kg	1310 mg/Kg	12
	Lead	13.5 mg/Kg	12.4 mg/Kg	9
	Magnesium	38.5 mg/Kg	29.9 mg/Kg	25
	Manganese	5.6 mg/Kg	4.9 mg/Kg	13
	Mercury	0.20 mg/Kg	0.17 mg/Kg	16
	Potassium	ND	77.6 mg/Kg	Not calculable
	Selenium	0.13 mg/Kg	ND	Not calculable
	Silver	4.1 mg/Kg	3.6 mg/Kg	13
	Sodium	139 mg/Kg	118 mg/Kg	16
	Vanadium	3.4 mg/Kg	3.2 mg/Kg	6
	Zinc	4.1 mg/Kg	3.4 mg/Kg	19
	Cyanide	0.10 mg/Kg	0.17 mg/Kg	52

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF014	**Client ID**	**BKS00201**	**BKS00201D**	
	Laboratory ID	**RA870008**	**RA870009**	
	Collection Date	**1/10/96**	**1/10/96**	
	Aluminum	6640 mg/Kg	4230 mg/Kg	44
	Arsenic	1.6 mg/Kg	0.99 mg/Kg	47
	Barium	11.4 mg/Kg	8.9 mg/Kg	34
	Beryllium	0.05 mg/Kg	ND	Not calculable
	Cadmium	0.21 mg/Kg	ND	Not calculable
	Calcium	132 mg/Kg	215 mg/Kg	48
	Chromium	3.4 mg/Kg	2.0 mg/Kg	52
	Cobalt	1.0 mg/Kg	ND	Not calculable
	Copper	3.4 mg/Kg	2.3 mg/Kg	39
	Iron	3340 mg/Kg	2220 mg/Kg	40
	Lead	5.9 mg/Kg	5.1 mg/Kg	15
	Magnesium	124 mg/Kg	72.5 mg/Kg	52
	Manganese	249 mg/Kg	217 mg/Kg	14
	Mercury	0.04 mg/Kg	0.05 mg/Kg	1
	Nickel	2.6 mg/Kg	ND	Not calculable
	Potassium	96.8 mg/Kg	65.8 mg/Kg	38
	Selenium	0.16 mg/Kg	0.14 mg/Kg	13
	Sodium	184 mg/Kg	346 mg/Kg	61
	Thallium	0.16 mg/Kg	ND	Not calculable
	Vanadium	8.1 mg/Kg	5.0 mg/Kg	47
	Zinc	5.6 mg/Kg	3.2 mg/Kg	55
	Cyanide	0.11 mg/Kg	ND	Not calculable
WF014	**Client ID**	**31B00201**	**31B00201D**	
	Laboratory ID	**RA870014**	**RA870015**	
	Collection Date	**1/11/96**	**1/11/96**	
	Aluminum	4360 mg/Kg	4050 mg/Kg	7
	Arsenic	1.0 mg/Kg	1.2 mg/Kg	18
	Barium	4.7 mg/Kg	4.3 mg/Kg	9
	Beryllium	0.05 mg/Kg	ND	Not calculable
	Cadmium	0.21 mg/Kg	0.34 mg/Kg	47
	Calcium	107 mg/Kg	121 mg/Kg	12
	Chromium	2.6 mg/Kg	2.1 mg/Kg	21
	Cobalt	0.76 mg/Kg	ND	Not calculable
	Copper	8.5 mg/Kg	8.4 mg/Kg	1
	Iron	2960 mg/Kg	2750 mg/Kg	7
	Lead	2.9 mg/Kg	2.9 mg/Kg	0
	Magnesium	81.1 mg/Kg	72.0 mg/Kg	12
	Manganese	8.0 mg/Kg	7.5 mg/Kg	7
	Mercury	0.04 mg/Kg	0.04 mg/Kg	0
	Nickel	1.8 mg/Kg	1.6 mg/Kg	12
	Potassium	88.8 mg/Kg	114 mg/Kg	25
	Sodium	175 mg/Kg	183 mg/Kg	5
	Vanadium	6.0 mg/Kg	5.3 mg/Kg	12
	Zinc	7.1 mg/Kg	6.4 mg/Kg	10

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF015	**Client ID**	**COS00101**	**COS00101D**	
	Laboratory ID	**RA908004**	**RA908005**	
	Collection Date	**1/18/96**	**1/18/96**	
	Aluminum	1770 mg/Kg	1620 mg/Kg	9
	Arsenic	0.57 mg/Kg	0.29 mg/Kg	65
	Barium	17.3 mg/Kg	11.6 mg/Kg	39
	Beryllium	0.07 mg/Kg	0.10 mg/Kg	35
	Calcium	521 mg/Kg	200 mg/Kg	89
	Chromium	2.0 mg/Kg	1.5 mg/Kg	29
	Copper	5.1 mg/Kg	5.0 mg/Kg	2
	Iron	906 mg/Kg	919 mg/Kg	1.4
	Lead	19.4 mg/Kg	8.9 mg/Kg	74
	Magnesium	142 mg/Kg	51.4 mg/Kg	94
	Manganese	4.9 mg/Kg	5.6 mg/Kg	13
	Sodium	120 mg/Kg	95.6 mg/Kg	23
	Vanadium	2.6 mg/Kg	2.8 mg/Kg	7
	Zinc	11.5 mg/Kg	3.3 mg/Kg	111
	Cyanide	0.12 mg/Kg	0.20 mg/Kg	50

Table XII
Summary of Analytes Exceeding Instrument Calibration
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Date	Analyte	Criteria		Qualifier
			Initial Calibration r	Continuing Calibration %R	
WF006	All	All metals	-	-	None
	All	Cyanide	-	-	None
	All	TRPH	-	-	None
WF007	All	All metals	-	-	None
	All	Cyanide	-	-	None
	All	TRPH	-	-	None
WF008	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF009	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF010	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF11A	All	All metals	-	-	None
	All	Cyanide	-	-	None
	All	TRPH	-	-	None
WF11B	All	All metals	-	-	None
	All	Cyanide	-	-	None
	All	TRPH	-	-	None
WF012	All	All metals	-	-	None
	All	All TCLP metals	-	-	None
	All	Cyanide	-	-	None
WF013	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF014	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF015	All	All metals	-	-	None
	All	Cyanide	-	-	None

Notes: r = correlation coefficient for initial calibrations

%R = percent recovery for continuing calibrations

J = the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample because QC criteria were not met (validation "J").

UJ = the analyte was not detected above the reported sample IDL However, the reported sample is approximate; the analyte concentration may not reliably be presumed to be less than the IDL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table XIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF006	Aluminum	-5.056 mg/Kg	All soil samples in SDG WF006
	Calcium	-5.002 mg/Kg	
	Copper	0.482 mg/Kg	
	Iron	-1.408 mg/Kg	
	Magnesium	-5.504 mg/Kg	
	Selenium	0.660 mg/Kg	
	Sodium	2.840 mg/Kg	
	Zinc	0.344 mg/Kg	
	Aluminum	-7.772 mg/Kg	All soil samples in SDG WF006
	Cobalt	-0.518 mg/Kg	
	Iron	-1.702 mg/Kg	
	Magnesium	-5.232 mg/Kg	
	Copper	2.690 ug/L	All water samples in SDG WF006
	Iron	-5.220 ug/L	
	Magnesium	-37.720 ug/L	
	Mercury	-0.029 ug/L	
	Selenium	2.300 ug/L	
	Sodium	51.840 ug/L	
	Cyanide	ND	All samples in SDG WF006
	TRPH	ND	All samples in SDG WF006
WF007	Barium	0.174 mg/Kg	All soil samples in SDG WF007
	Calcium	6.280 mg/Kg	
	Iron	1.776 mg/Kg	
	Sodium	6.856 mg/Kg	
	Aluminum	47.800 ug/L	All water samples in SDG WF007
	Beryllium	0.250 ug/L	
	Calcium	38.580 ug/L	
	Cobalt	-2.750 ug/L	
	Copper	6.560 ug/L	
	Iron	15.910 ug/L	
	Nickel	12.410 ug/L	
	Sodium	-320.390 ug/L	
	Zinc	2.210 ug/L	
	Cyanide	ND	All samples in SDG WF007
	TRPH	ND	All samples in SDG WF007
WF008	Aluminum	10.014 mg/Kg	All soil samples in SDG WF008
	Beryllium	0.068 mg/Kg	
	Copper	0.454 mg/Kg	
	Iron	3.440 mg/Kg	
	Sodium	-72.604 mg/Kg	
	Aluminum	5.768 mg/Kg	All soil samples in SDG WF008
	Beryllium	0.060 mg/Kg	
	Cobalt	-0.428 mg/Kg	
	Copper	0.728 mg/Kg	
	Iron	1.184 mg/Kg	
	Nickel	2.284 mg/Kg	
	Sodium	-74.238 mg/Kg	
	Thallium	-0.470 mg/Kg	

Table XIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF008	Aluminum	47.800 ug/L	All water samples in SDG WF008
	Beryllium	0.250 ug/L	
	Calcium	38.580 ug/L	
	Cobalt	-2.750 ug/L	
	Copper	6.560 ug/L	
	Iron	15.910 ug/L	
	Nickel	12.410 ug/L	
	Sodium	-320.390 ug/L	
	Zinc	2.210 ug/L	
	Cyanide	ND	All samples in SDG WF008
WF009	Aluminum	10.014 mg/Kg	All soil samples in SDG WF009
	Beryllium	0.068 mg/Kg	
	Copper	0.454 mg/Kg	
	Iron	3.440 mg/Kg	
	Sodium	-72.604 mg/Kg	
	Aluminum	5.768 mg/Kg	All soil samples in SDG WF009
	Beryllium	0.068 mg/Kg	
	Cobalt	-0.428 mg/Kg	
	Copper	0.728 mg/Kg	
	Iron	1.184 mg/Kg	
	Nickel	2.284 mg/Kg	
	Sodium	-74.238 mg/Kg	
	Thallium	-0.470 mg/Kg	
	Aluminum	47.800 ug/L	All water samples in SDG WF009
	Beryllium	0.250 ug/L	
	Calcium	38.580 ug/L	
	Cobalt	-2.750 ug/L	
	Copper	6.560 ug/L	
	Iron	15.910 ug/L	
	Nickel	12.410 ug/L	
	Sodium	-320.390 ug/L	
	Zinc	2.210 ug/L	
	Cyanide	ND	All samples in SDG WF009
WF010	Aluminum	6.602 mg/Kg	All soil samples in SDG WF010
	Beryllium	0.066 mg/Kg	
	Copper	0.482 mg/Kg	
	Iron	1.828 mg/Kg	
	Mercury	-0.008 mg/Kg	
	Sodium	-74.902 mg/Kg	
	Aluminum	47.800 ug/L	All water samples in SDG WF010
	Beryllium	0.250 ug/L	
	Calcium	38.580 ug/L	
	Cobalt	-2.750 ug/L	
	Copper	6.560 ug/L	
	Iron	15.910 ug/L	
	Nickel	12.410 ug/L	
	Sodium	-320.390 ug/L	
	Zinc	2.210 ug/L	
	Cyanide	ND	All samples in SDG WF010

Table XIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF11A	Iron	14.610 ug/L	All samples in SDG WF11A
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Cyanide	ND	All samples in SDG WF11A
	TRPH	ND	All samples in SDG WF11A
WF11B	Iron	14.610 ug/L	All water samples in SDG WF11B
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Aluminum	2.922 mg/Kg	All soil samples in SDG WF11B
	Calcium	10.253 mg/Kg	
	Iron	1.620 mg/Kg	
	Sodium	11.866 mg/Kg	
	Zinc	0.512 mg/Kg	
	Cyanide	ND	All samples in SDG WF11B
	TRPH	ND	All samples in SDG WF11B
WF012	Iron	14.610 ug/L	All water samples in SDG WF12
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Barium	0.081 mg/Kg	All soil samples in SDG WF12
	Calcium	6.408 mg/Kg	
	Iron	0.684 mg/Kg	
	Sodium	9.938 mg/Kg	
	Zinc	0.321 mg/Kg	
	Arsenic, TCLP	-0.01539 mg/L	All samples in SDG WF12
	Barium, TCLP	0.00054 mg/L	
	Lead, TCLP	-0.02157 mg/L	
	Silver, TCLP	-0.00215 mg/L	
WF013	Iron	14.610 ug/L	All water samples in SDG WF13
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Barium	0.082 mg/Kg	All soil samples in SDG WF13
	Calcium	9.329 mg/Kg	
	Iron	0.799 mg/Kg	
	Lead	0.120 mg/Kg	
	Magnesium	4.111 mg/Kg	
	Potassium	56.814 mg/Kg	
	Sodium	8.614 mg/Kg	
	Zinc	0.240 mg/Kg	

Table XIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF014	Iron	14.610 ug/L	All water samples in SDG WF14
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Cyanide	2.034 ug/L	All water samples in SDG WF14
	Beryllium	-0.049 mg/Kg	All soil samples in SDG WF14
	Calcium	15.945 mg/Kg	
	Iron	0.701 mg/Kg	
	Manganese	0.103 mg/Kg	
	Sodium	14.786 mg/Kg	
	Zinc	0.601 mg/Kg	
WF015	Iron	4.210 ug/L	All water samples in SDG WF15
	Sodium	30.690 ug/L	
	Thallium	0.700 ug/L	
	Zinc	1.400 ug/L	
	Cyanide	2.034 ug/L	
	Aluminum	2.553 mg/Kg	All soil samples in SDG WF15
	Barium	0.093 mg/Kg	
	Beryllium	0.043 mg/Kg	
	Calcium	6.248 mg/Kg	
	Iron	0.759 mg/Kg	
	Sodium	4.452 mg/Kg	
	Zinc	0.365 mg/Kg	

Table XIV
Summary of Field Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF006	**Client ID:**	**01R00101**		
	Laboratory ID:	**G8876012**		
	Collection Date:	**12/6/95**		
	Type:	**Rinsate**		
	Calcium		178 ug/L	J
	Sodium		60.6 ug/L	UJ
	Zinc		2.9 ug/L	J
	Cyanide		ND	None
	TRPH		ND	None
WF006	**Client ID:**	**01F00101**		
	Laboratory ID:	**G8776013**		
	Collection Date:	**12/6/95**		
	Type:	**Source Blank**		
	Copper		3.3 ug/L	UJ
	Sodium		113 ug/L	UJ
	Cyanide		ND	None
	TRPH		ND	None
WF007	**Client ID:**	**10R00101**		
	Laboratory ID:	**G8889009**		
	Collection Date:	**12/7/95**		
	Type:	**Rinsate**		
	Aluminum		52.3 ug/L	UJ
	Barium		0.70 ug/L	J
	Beryllium		0.25 ug/L	UJ
	Calcium		23.0 ug/L	UJ
	Copper		7.1 ug/L	UJ
	Iron		67.3 ug/L	UJ
	Zinc		17.6 ug/L	J
	Cyanide		ND	None
	TRPH		ND	None
WF008	**Client ID:**	**15R00101**		
	Laboratory ID:	**G8913020**		
	Collection Date:	**12/11/95**		
	Type:	**Rinsate**		
	Aluminum		54.6 ug/L	UJ
	Barium		1.0 ug/L	J
	Beryllium		0.21 ug/L	UJ
	Calcium		22.6 ug/L	UJ
	Copper		5.0 ug/L	UJ
	Iron		45.4 ug/L	UJ
	Zinc		1.5 ug/L	UJ
	Cyanide		ND	None

Table XIV
Summary of Field Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF009	**Client ID:**	**15R00201**		
	Laboratory ID:	**G8914012**		
	Collection Date:	**12/11/95**		
	Type:	**Rinsate**		
	Aluminum		69.8 ug/L	UJ
	Barium		1.0 ug/L	J
	Beryllium		0.29 ug/L	UJ
	Calcium		58.5 ug/L	UJ
	Copper		6.5 ug/L	UJ
	Iron		29.2 ug/L	UJ
	Nickel		48.7 ug/L	U
	Zinc		2.7 ug/L	J
	Cyanide		ND	None
WF010	**Client ID:**	**31R00101**		
	Laboratory ID:	**G8924006**		
	Collection Date:	**12/12/965**		
	Type:	**Rinsate**		
	Aluminum		56.5 ug/L	UJ
	Barium		0.86 ug/L	J
	Beryllium		0.42 ug/L	UJ
	Calcium		18.7 ug/L	UJ
	Copper		5.2 ug/L	UJ
	Iron		35.6 ug/L	UJ
	Zinc		3.2 ug/L	UJ
WF11B	**Client ID:**	**12R00101**		
	Laboratory ID:	**RA847012**		
	Collection Date:	**1/5/96**		
	Type:	**Rinsate**		
	Barium		0.30 ug/L	J
	Calcium		42.3 ug/L	J
	Iron		11.6 ug/L	UJ
	Sodium		24.6 ug/L	UJ
	Zinc		2.2 ug/L	UJ
	Cyanide		ND	None
	TRPH		ND	None
WF012	**Client ID:**	**31R00201**		
	Laboratory ID:	**RA855021**		
	Collection Date:	**1/8/96**		
	Type:	**Rinsate**		
	Copper		1.3 ug/L	UJ
	Iron		21.2 ug/L	UJ
	Sodium		40.3 ug/L	UJ
	Zinc		3.0 ug/L	UJ
WF013	**Client ID:**	**16R00101**		
	Laboratory ID:	**RA856017**		
	Collection Date:	**1/9/96**		
	Type:	**Rinsate**		
	Iron		7.0 ug/L	UJ
	Sodium		30.0 ug/L	UJ
	Zinc		3.4ug/L	UJ

Table XIV
Summary of Field Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF014	**Client ID:**	**BKR00101**		
	Laboratory ID:	**RA870001**		
	Collection Date:	**1/10/96**		
	Type:	**Rinsate**		
	Calcium		42.3 ug/L	J
	Iron		7.8 ug/L	UJ
	Sodium		31.9 ug/L	UJ
	Zinc		1.8 ug/L	UJ
	Cyanide		2.0 ug/L	UJ
WF015	**Client ID:**	**COR00101**		
	Laboratory ID:	**RA908001**		
	Collection Date:	**1/18/96**		
	Type:	**Rinsate**		
	Iron		9.1 ug/L	UJ
	Lead		0.60 ug/L	J
	Sodium		58.6 ug/L	UJ
	Thallium		0.70 ug/L	UJ
	Zinc		2.2 ug/L	UJ
	Cyanide		2.0 ug/L	UJ
WF015	**Client ID:**	**COF00101**		
	Laboratory ID:	**RA908002**		
	Collection Date:	**1/18/96**		
	Type:	**Source Blank**		
	Iron		8.9 ug/L	UJ
	Sodium		55.0 ug/L	UJ
	Zinc		2.0 ug/L	UJ

Table XV
Sample Event PARCC Summary
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF006	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
	TRPH	Acceptable	Acceptable	Acceptable	100	Acceptable
WF007	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
	TRPH	Acceptable	Acceptable	Acceptable	100	Acceptable
WF008	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF009	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	99.5[3]	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF010	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF11A	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
	TRPH	Acceptable	Acceptable	Acceptable	100	Acceptable
WF11B	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
	TRPH	Acceptable	Acceptable	Acceptable	100	Acceptable
WF012	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF013	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	94.4[3]	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF014	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	99.7[3]	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable

Table XV
Sample Event PARCC Summary
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF015	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	80.0[3]	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable

[1]Cumulative of sampling and analytical components.
[2]Analytical component.
[3]A few samples have results whose concentrations were rejected.

Notes: All completeness is expressed as the ratio of number of sample results considered usable (i.e., not qualified as rejected) to the total number of sample results.

% = percent
TRPH = Total Recoverable Petroleum Hydrocarbons

APPENDIX A

Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida
PARCC Summary Tables

Draft Version

12/12/97

APPENDIX A

Table of Contents

Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

ble 1

SDG#: WF022					VALIDATION SAMPLE TABLE				LDC#: 1932A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#: 8532-20**
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides /PCBs**	**Metals**	**Cyanide**
BKT01001	RB858001	TB	water	7-16-96	X				
BKR01001	RB858002	R	water	7-16-96	X	X	X	X	X
BKG00101	RB858003		water	7-16-96	X	X	X	X	X
BKG00101D	RB858004	FD	water	7-16-96	X	X	X	X	X
BKG00102	RB858005		water	7-16-96	X	X	X	X	X
BKG00102F	RB858006		water	7-16-96				X	
BKG00103	RB858007		water	7-16-96	X	X	X	X	X
BKG00202	RB858008		water	7-17-96	X	X	X	X	X
BKG00201	RB858009		water	7-17-96	X	X	X	X	X
BKF01001	RB858010	SB	water	7-17-96	X	X	X	X	X
17T01101	RB873001	TB	water	7-18-96	X				
17G00102	RB873002		water	7-18-96	X	X	X	X	X
17G00101	RB873003		water	7-18-96	X	X	X	X	X
17G00201	RB873004		water	7-18-96	X	X	X	X	X
17G00301	RB873005		water	7-18-96	X	X	X	X	X
17G00201F	RB873006		water	7-18-96				X	
01G00101	RB873007		water	7-19-96	X	X	X	X	X
01G00102	RB873008		water	7-19-96	X	X	X	X	X
01G00102D	RB873009		water	7-19-96	X	X	X	X	X
BKG00101MS	RB858003MS	MS	water	7-16-96	X	X	X	X	X
BKG00101MSD	RB858003MSD	MSD	water	7-16-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF023					VALIDATION SAMPLE TABLE				LDC#: 1942A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides /PCBs**	**Metals**	**Cyanide**
01T01201	RB887001	TB	water	7-22-96	X				
01G00401	RB887002		water	7-22-96	X	X	X	X	X
01G00201	RB887003		water	7-22-96	X	X	X	X	X
01G00201F	RB887004		water	7-22-96				X	
01R01101	RB887005	R	water	7-23-96	X	X	X	X	X
01G00301	RB887006		water	7-23-96	X	X	X	X	X
BKG00301	RB887007		water	7-23-96	X	X	X	X	X
02G00201	RB887008		water	7-23-96	X	X	X	X	X
02G00101	RB887009		water	7-23-96	X	X	X	X	X
02G00101F	RB887010		water	7-23-96				X	
18G00301	RB887011		water	7-24-96	X	X	X	X	X
02G00301	RB887012		water	7-24-96	X	X	X	X	X
02G00301D	RB887013	FD	water	7-24-96	X	X	X	X	X
16T01301	RB887014		water	7-25-96	X				
16G00701	RB887015		water	7-25-96	X	X	X	X	X
16G00702	RB887016		water	7-25-96	X	X	X	X	X
16G00702DL	RB887016DL		water	7-25-96	X				
16G00703	RB887017		water	7-25-96	X	X	X	X	X
16G00703DL	RB887017DL		water	7-25-96	X				
18G00201	RB887018		water	7-26-96	X	X	X	X	X
02G00301MS	RB887012MS	MS	water	7-24-96	X	X	X	X	X
02G00301MSD	RB887012MSD	MSD	water	7-24-96	X	X	X	X	X

Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF024 | VALIDATION SAMPLE TABLE | LDC#: 1943A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
18T01401	RB920001	TB	water	7-29-96	X				
18G00101	RB920002		water	7-29-96	X	X	X	X	X
15G00401	RB920003		water	7-30-96	X	X	X	X	X
BKG00203	RB920004		water	7-30-96	X	X	X	X	X
15R01201	RB920005	R	water	7-31-96	X	X	X	X	X
BKG00203F	RB920006		water	7-30-96				X	
15G00702	RB920007		water	7-31-96	X	X	X	X	X
15G00702F	RB920008		water	7-31-96				X	
15G00701	RB920009		water	7-31-96	X	X	X	X	X
15G00701D	RB920010	FD.	water	7-31-96	X	X	X	X	X
15G00701MS	RB920009MS	MS	water	7-31-96	X	X	X	X	X
15G00701MSD	RB920009MSD	MSD	water	7-31-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF025					VALIDATION SAMPLE TABLE				LDC#: 1956A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides /PCBs**	**Metals**	**Cyanide**
15T01501	RB956001	TB	water	8-5-96	X				
15G00703	RB956002		water	8-5-96	X	X	X	X	X
15G00503	RB956003		water	8-6-96	X	X	X	X	X
15G00503DL	RB956003DL		water	8-6-96	X				
15G00502	RB956004		water	8-6-96	X	X	X	X	X
15G00501	RB956005		water	8-6-96	X	X	X	X	X
15G00601	RB956006		water	8-7-96	X	X	X	X	X
15G00603	RB956007		water	8-7-96	X	X	X	X	X
15G00601D	RB956008	FD	water	8-7-96	X	X	X	X	X
15G00503F	RB956009		water	8-6-96				X	
15G00501F	RB956010		water	8-6-96				X	
15R01301	RB956011	R	water	8-7-96	X	X	X	X	X
15T01601	RB956012	TB	water	8-8-96	X				
15G00301	RB956013		water	8-8-96	X	X	X	X	X
15G00302	RB956014		water	8-8-96	X	X	X	X	X
15G00303	RB956015		water	8-9-96	X	X	X	X	X
15G00101	RB956016		water	8-8-96	X	X	X	X	X
15G00203	RB956017		water	8-9-96	X	X	X	X	X
15G00301F	RB956018		water	8-8-96				X	
15G00203F	RB956019		water	8-9-96				X	
15G00601MS	RB956006MS	MS	water	8-7-96	X	X	X	X	X
15G00601MSD	RB956006MSD	MSD	water	8-7-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF026 — VALIDATION SAMPLE TABLE — LDC#: 1957A

Project Name: NAS Whiting Field — Parameters/Analytical Method — Job#: 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
15T01701	RB980001	TB	water	8-12-96	X				
15G00202	RB980002		water	8-12-96	X	X	X	X	X
15G00201	RB980003		water	8-13-96	X	X	X	X	X
15G00802	RB980004		water	8-13-96	X	X	X	X	X
15G00802R	RB980004R		water	8-13-96		X			
15G00801	RB980005		water	8-13-96	X	X	X	X	X
16G00201	RB980006		water	8-14-96	X	X	X	X	X
15G00803	RB980007		water	8-14-96	X	X	X	X	X
16G00803D	RB980008	FD	water	8-14-96	X	X	X	X	X
15G00202F	RB980009		water	8-12-96				X	
15G00201F	RB980010		water	8-13-96				X	
15G00802F	RB980011		water	8-13-96				X	
15R01401	RB980012	R	water	8-14-96	X	X	X	X	X
15G00803F	RB980013		water	8-14-96				X	
16G00201F	RB980014		water	8-14-96				X	
16T01801	RB980015	TB	water	8-15-96	X				
16G00202	RB980016		water	8-15-96	X	X	X	X	X
16G00202DL	RB980016DL		water	8-15-96	X				
16G00203	RB980017		water	8-15-96	X	X	X	X	X
16G00602	RB980018		water	8-15-96	X	X	X	X	X
16G00601	RB980019		water	8-16-96	X	X	X	X	X
16G00403	RB980020		water	8-16-96	X	X	X	X	X
16G00403DL	RB980020DL		water	8-16-96	X				
16G00403D	RB980021		water	8-16-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1									
SDG#: WF026				VALIDATION SAMPLE TABLE					**LDC#: 1957A**
Project Name: NAS Whiting Field				Parameters/Analytical Method					**Job#: 8532-20**
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides /PCBs**	**Metals**	**Cyanide**
16G00403DDL	RB980021DL		water	8-16-96	X				
16G00601F	RB980022		water	8-16-96				X	
16G00403F	RB980023		water	8-16-96				X	
15G00803MS	RB980007MS	MS	water	8-14-96	X	X	X	X	X
15G00803MSD	RB980007MSD	MSD	water	8-14-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF025		VALIDATION SAMPLE TABLE			LDC#: 1970A
Project Name: NAS Whiting Field		Parameters/Analytical Method			**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**Pesticides/PCBs**
15G00502RE	RB956004RE		water	8-6-96	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF027					VALIDATION SAMPLE TABLE				LDC#: 1970B
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#: 8532-20**
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides /PCBs**	**Metals**	**Cyanide**
16T01901	RC016001	TB	water	8-19-96	X				
16G00401	RC016002		water	8-19-96	X	X	X	X	X
16G00402	RC016003		water	8-19-96	X	X	X	X	X
16G00101	RC016004		water	8-19-96	X	X	X	X	X
16G00301	RC016005		water	8-20-96	X	X	X	X	X
16G00302	RC016006		water	8-20-96	X	X	X	X	X
16G00304	RC016007		water	8-20-96	X	X	X	X	X
16G00303	RC016008		water	8-21-96	X	X	X	X	X
16G00501	RC016009		water	8-21-96	X	X	X	X	X
16G00303F	RC016010		water	8-21-96				X	
16G00501F	RC016011		water	8-21-96				X	
16R01501	RC016012	R	water	8-21-96	X	X	X	X	X
16G00501D	RC016013	FD	water	8-21-96	X	X	X	X	X
66T02001	RC016014	TB	water	8-22-96	X				
66G02101	RC016015		water	8-22-96	X	X	X	X	X
66G02103	RC016016		water	8-22-96	X	X	X	X	X
66G02102	RC016017		water	8-22-96	X	X	X	X	X
09G00101	RC016018		water	8-23-96	X	X	X	X	X
09G00301	RC016019		water	8-23-96	X	X	X	X	X
09G00301D	RC016020	FD	water	8-23-96	X	X	X	X	X
66G02102F	RC016021		water	8-23-96				X	
09G00301F	RC016022		water	8-23-96				X	
16G00501MS	RC016009MS	MS	water	8-21-96	X	X	X	X	X
16G00501MSD	RC016009MSD	MSD	water	8-21-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF028 | VALIDATION SAMPLE TABLE | LDC#: 1974A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
10T02101	RC044001	TB	water	8-26-96	X				
09G00201	RC044002		water	8-26-96	X	X	X	X	X
10G00101	RC044003		water	8-26-96	X	X	X	X	X
10G00201	RC044004		water	8-26-96	X	X	X	X	X
11G00402	RC044005		water	8-26-96	X	X	X	X	X
11G00102	RC044006		water	8-27-96	X	X	X	X	X
11G00401	RC044007		water	8-27-96	X	X	X	X	X
11T02201	RC044008	TB	water	8-28-96	X				
11G00301	RC044009		water	8-28-96	X	X	X	X	X
11G00101	RC044010		water	8-28-96	X	X	X	X	X
11G00201	RC044011		water	8-28-96	X	X	X	X	X
12G00101	RC044012		water	8-27-96	X	X	X	X	X
12G00201	RC044013		water	8-27-96	X	X	X	X	X
11G00201F	RC044014		water	8-28-96				X	
11G00301F	RC044015		water	8-28-96				X	
11R01601	RC044016		water	8-28-96	X	X	X	X	X
12G00101D	RC044017	FD	water	8-27-96	X	X	X	X	X
11G00201D	RC044018	FD	water	8-28-96	X	X	X	X	X
12G00101MS	RC044012MS	MS	water	8-27-96	X	X	X	X	X
12G00101MSD	RC044012MSD	MSD	water	8-27-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF029 | **VALIDATION SAMPLE TABLE** | **LDC#: 1989A**

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#: 8532-20**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
13T02301	RC092001	TB	water	9-9-96	X				
13G00101	RC092002		water	9-9-96	X	X	X	X	X
13G00102	RC092003		water	9-9-96	X	X	X	X	X
13G00201	RC092004		water	9-10-96	X	X	X	X	X
13G00103	RC092005		water	9-10-96	X	X	X	X	X
14G00201	RC092006		water	9-10-96	X	X	X	X	X
14G00101	RC092007		water	9-11-96	X	X	X	X	X
13R01701	RC092008	R	water	9-11-96	X	X	X	X	X
14G00101D	RC092009	FD	water	9-11-96	X	X	X	X	X
13G00103F	RC092010		water	9-10-96				X	
66T02401	RC092011	TB	water	9-12-96	X				
66G00901	RC092012		water	9-12-96	X	X	X	X	X
66G00904	RC092013		water	9-12-96	X	X	X	X	X
66G00902	RC092014		water	9-13-96	X	X	X	X	X
66G00903	RC092015		water	9-13-96	X	X	X	X	X
66G00903F	RC092016		water	9-13-96				X	
14G00101MS	RC092007MS	MS	water	9-11-96	X	X	X	X	X
14G00101MSD	RC092007MSD	MSD	water	9-11-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF030 | **VALIDATION SAMPLE TABLE** | **LDC#: 2000A**

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#: 8532-20**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
66T02501	RC121001	TB	water	9-16-96	X				
66G00801	RC121002		water	9-16-96	X	X	X	X	X
66G00802	RC121003		water	9-16-96	X	X	X	X	X
66G00803	RC121004		water	9-17-96	X	X	X	X	X
66G00804	RC121005		water	9-17-96	X	X	X	X	X
66G00602	RC121006		water	9-17-96	X	X	X	X	X
66G00601	RC121007		water	9-18-96	X	X	X	X	X
66G00603	RC121008		water	9-18-96	X	X	X	X	X
66G00804F	RC121009		water	9-17-96				X	
66R01801	RC121010		water	9-18-96	X	X	X	X	X
66G00601D	RC121011	FD	water	9-18-96	X	X	X	X	X
66T02601	RC121012	TB	water	9-19-96	X				
66G00604	RC121013		water	9-19-96	X	X	X	X	X
66G02201	RC121014		water	9-19-96	X	X	X	X	X
66G02202	RC121015		water	9-19-96	X	X	X	X	X
66G02203	RC121016		water	9-20-96	X	X	X	X	X
66G02203D	RC121017	FD	water	9-20-96	X	X	X	X	X
66G00601MS	RC121007MS	MS	water	9-18-96	X	X	X	X	X
66G00601MSD	RC121007MSD	MSD	water	9-18-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF031	VALIDATION SAMPLE TABLE	LDC#: 2031A
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
05T02701	MB928001	TB	water	9-23-96	X				
05G00801	MB928002		water	9-23-96	X	X	X	X	X
05G00802	MB928003		water	9-23-96	X	X	X	X	X
05G00901	MB928004		water	9-24-96	X	X	X	X	X
05G00902	MB928005		water	9-24-96	X	X	X	X	X
05G01002	MB928006		water	9-24-96	X	X	X	X	X
05G01001	MB928007		water	9-25-96	X	X	X	X	X
05G00301	MB928008		water	9-25-96	X	X	X	X	X
05G00301RE	MB928008RE		water	9-25-96		X			
05G00801F	MB928009		water	9-23-96				X	
05G00902F	MB928010		water	9-24-96				X	
05R01901	MB928011	R	water	9-25-96	X	X	X	X	X
05G01001D	MB928012	FD	water	9-25-96	X	X	X	X	X
33T02801	MB958001	TB	water	9-26-96	X				
05G00101	MB958002		water	9-26-96	X	X	X	X	X
33G00501	MB958003		water	9-26-96	X	X	X	X	X
33G00201	MB958004		water	9-26-96	X	X	X	X	X
33G00101	MB958005		water	9-27-96	X	X	X	X	X
33G00301	MB958006		water	9-27-96	X	X	X	X	X
33G00301D	MB958007	FD	water	9-27-96	X	X	X	X	X
05G01001MS	MB928007MS	MS	water	9-25-96	X	X	X	X	X
05G01001MSD	MB928007MSD	MSD	water	9-25-96	X	X	X		
05G01001DUP	MB928007DUP	DUP	water	9-25-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

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SDG#: WF031B					VALIDATION SAMPLE TABLE				LDC#: 2121A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 7560-32
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (CLP-1.9)**	**SVOA (CLP-1.9)**	**Pesticides /PCBs (CLP-1.9)**	**Metals (CLP-2.1)**	**Cyanide**
05G01002	MC447001		water	11-21-96	X	X	X	X	X
16T04001	MC447002	TB	water	11-21-96	X				

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF032					VALIDATION SAMPLE TABLE				LDC#: 2046A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (CLP-1.9)**	**SVOA (CLP-1.9)**	**Pesticides /PCBs (CLP-1.9)**	**Metals**	**Cyanide**
06T02901	MC011001	TB	water	9-30-96	X				
33G00401	MC011002		water	9-30-96	X	X	X	X	X
06G00102	MC011003		water	10-1-96	X	X	X	X	X
06G00101	MC011004		water	10-1-96	X	X	X	X	X
06G00301	MC011005		water	10-2-96	X	X	X	X	X
06R02001	MC011006	R	water	10-2-96	X	X	X	X	X
29G00501	MC011007		water	10-2-96	X	X	X	X	X
29G00501D	MC011008	FD	water	10-2-96	X	X	X	X	X
29T03001	MC037001	TB	water	10-3-96	X				
29G00101	MC037002		water	10-3-96	X	X	X	X	X
66G01201	MC037003		water	10-3-96	X	X	X	X	X
66G00102	MC037004		water	10-4-96	X	X	X	X	X
29G00501MS	MC011007MS	MS	water	10-2-96	X	X	X	X	X
29G00501MSD	MC011007MSD	MSD	water	10-2-96	X	X	X		
29G00501DUP	MC011007DUP	DUP	water	10-2-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF033					VALIDATION SAMPLE TABLE				LDC#: 2069A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#: 8532-20**
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (CLP-1.9)**	**SVOA (CLP-1.9)**	**Pesticides /PCBs (CLP-1.9)**	**Metals**	**Cyanide**
29T03101	MC085001	TB	water	10-7-96	X				
26G00401	MC085002		water	10-7-96	X	X	X	X	X
26G00301	MC085003		water	10-8-96	X	X	X	X	X
66G00202	MC085004		water	10-8-96	X	X	X	X	X
29G00201	MC085005		water	10-8-96	X	X	X	X	X
66G01901	MC085006		water	10-9-96	X	X	X	X	X
66R02101	MC085007	R	water	10-9-96	X	X	X	X	X
66T03201	MC118001	TB	water	10-10-96	X				
66G00201	MC118002		water	10-9-96	X	X	X	X	X
66G00201D	MC118003	FD	water	10-9-96	X	X	X	X	X
07G00101	MC118004		water	10-10-96	X	X	X	X	X
30G00501	MC118005		water	10-10-96	X	X	X	X	X
66G00301	MC118006		water	10-11-96	X	X	X	X	X
66G00201MS	MC118002MS	MS	water	10-9-96	X	X	X	X	X
66G00201MSD	MC118002MSD	MSD	water	10-9-96	X	X	X		
66G00201DUP	MC118002DUP	DUP	water	10-9-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF034 **VALIDATION SAMPLE TABLE** **LDC#: 2070A**

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#: 8532-20**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide
66T03301	MC153001	TB	water	10-14-96	X				
66G02001	MC153002		water	10-14-96	X	X	X	X	X
66G00302	MC153003		water	10-15-96	X	X	X	X	X
66G01801	MC153004		water	10-16-96	X	X	X	X	X
30G00301	MC153005		water	10-16-96	X	X	X	X	X
30G00401	MC153006		water	10-16-96	X	X	X	X	X
66R02201	MC153007	R	water	10-16-96	X	X	X	X	X
30G00301D	MC153008	FD	water	10-16-96	X	X	X	X	X
66T03401	MC176001	TB	water	10-17-96	X				
66G01101	MC176002		water	10-17-96	X	X	X	X	X
66G01301	MC176003		water	10-17-96	X	X	X	X	X
66G00501	MC176004		water	10-18-96	X	X	X	X	X
66G00501F	MC176005		water	10-18-96				X	
30G00301MS	MC153005MS	MS	water	10-16-96	X	X	X	X	X
30G00301MSD	MC153005MSD	MSD	water	10-16-96	X	X	X		
30G00301DUP	MC153005DUP	DUP	water	10-16-96				X	X

= Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = M Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF035 | **VALIDATION SAMPLE TABLE** | **LDC#: 2076A**

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#: 8532-20**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide
66T03501	MC214001	TB	water	10-21-96	X				
66G00401	MC214002		water	10-21-96	X	X	X	X	X
66G01601	MC214003		water	10-22-96	X	X	X	X	X
66G01501	MC214004		water	10-22-96	X	X	X	X	X
66G01701	MC214005		water	10-23-96	X	X	X	X	X
66R02301	MC214006	R	water	10-23-96	X	X	X	X	X
66G01701D	MC214007	FD	water	10-23-96	X	X	X	X	X
66T03601	MC231001	TB	water	10-24-96	X				
66G00101	MC231002		water	10-24-96	X	X	X	X	X
08G00101	MC231003		water	10-24-96	X	X	X	X	X
66G01001	MC231004		water	10-25-96	X	X	X	X	X
66G01701MS	MC214005MS	MS	water	10-23-96	X	X	X	X	X
66G01701MSD	MC214005MSD	MSD	water	10-23-96	X	X	X		
66G01701DUP	MC214005DUP	DUP	water	10-23-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF036					VALIDATION SAMPLE TABLE				LDC#: 2077A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (CLP-1.9)**	**SVOA (CLP-1.9)**	**Pesticides /PCBs (CLP-1.9)**	**Metals**	**Cyanide**
66T03701	MC262001	TB	water	10-28-96	X				
66G00701	MC262002		water	10-29-96	X	X	X	X	X
54G00201	MC262003		water	10-29-96	X	X	X	X	X
54G00101	MC262004		water	10-30-96	X	X	X	X	X
31G00201	MC262005		water	10-30-96	X	X	X	X	X
31G00201F	MC262006		water	10-30-96				X	
54R02401	MC262007	R	water	10-30-96	X	X	X	X	X
54G00101D	MC262008	FD	water	10-30-96	X	X	X	X	X
31T03801	MC284001	TB	water	10-31-96	X				
31G00301	MC284002		water	10-31-96	X	X	X	X	X
31G00402	MC284003		water	10-31-96	X	X	X	X	X
31G00403	MC284004		water	11-1-96	X	X	X	X	X
54G00101MS	MC262004MS	MS	water	10-30-96	X	X	X	X	X
54G00101MSD	MC262004MSD	MSD	water	10-30-96	X	X	X		
54G00101DUP	MC262004DUP	DUP	water	10-30-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF037					VALIDATION SAMPLE TABLE				LDC#: 2071A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (CLP-1.9)**	**SVOA (CLP-1.9)**	**Pesticides /PCBs (CLP-1.9)**	**Metals**	**Cyanide**
15T03901	MC424001	TB	water	11-18-96	X				
15G00502	MC424002		water	11-18-96	X				
15G00503	MC424003		water	11-18-96	X				
16G00202	MC424004		water	11-19-96	X				
16G00203	MC424005		water	11-19-96	X				
15G00802	MC424006		water	11-20-96	X				
15G00803	MC424007		water	11-20-96	X				
15G00803D	MC424008	FD	water	11-20-96	X				
15R02501	MC424009	R	water	11-20-96	X				
15F00201	MC424010		water	11-20-96	X	X	X	X	X
16G00702	MC448001		water	11-21-96	X				
16G00703	MC448002		water	11-21-96	X				
16G00403	MC448003		water	11-22-96	X				
16T04001	MC448004	TB	water	11-21-96	X				
15G00803MS	MC424007MS	MS	water	11-20-96	X				
15G00803MSD	MC424007MSD	MSD	water	11-20-96	X				

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF038					VALIDATION SAMPLE TABLE	LDC#: 2099A
Project Name: NAS Whiting Field					Parameters/Analytical Method	Job#: 7560-32
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (CLP-1.9)**	
36T04101	MC687001	TB	water	12-17-96	X	
36BO0101	MC687002		soil	12-17-96	X	
36BO0102	MC687003		soil	12-17-96	X	
36BO0103	MC687004		soil	12-17-96	X	
36BO0201	MC687005		soil	12-17-96	X	
36BO0202	MC687006		soil	12-17-96	X	
36BO0203	MC687007		soil	12-17-96	X	
36BO0301	MC687008		soil	12-17-96	X	
36BO0302	MC687009		soil	12-17-96	X	
36BO0303	MC687010		soil	12-17-96	X	
36BO0303D	MC687011	FD	soil	12-17-96	X	
36BO0401	MC687012		soil	12-18-96	X	
36BO0401DL	MC687012DL		soil	12-18-96	X	
36BO0402	MC687013		soil	12-18-96	X	
36BO0403	MC687014		soil	12-18-96	X	
36BO0403D	MC687015	FD	soil	12-18-96	X	
36RO2601	MC687016	R	water	12-18-96	X	
36BO0303MS	MC687011MS	MS	soil	12-17-96	X	
36BO0303MSD	MC687011MSD	MSD	soil	12-17-96	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF039					VALIDATION SAMPLE TABLE	LDC#: 2102A
Project Name: NAS Whiting Field					Parameters/Analytical Method	**Job#:** 7560-32
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (CLP-1.9)**	
35TO4201	MC698001	TB	water	12-19-96	X	
35BO0101	MC698002		soil	12-20-96	X	
35BO0102	MC698003		soil	12-20-96	X	
35BO0102DL	MC698003DL		soil	12-20-96	X	
35BO0103	MC698004		soil	12-20-96	X	
35BO0104	MC698005		soil	12-20-96	X	
35BO0105	MC698006		soil	12-20-96	X	
35BO0106	MC698007		soil	12-21-96	X	
35BO0201	MC698008		soil	12-21-96	X	
35BO0202	MC698009		soil	12-21-96	X	
35BO0203	MC698010		soil	12-21-96	X	
35RO2701	MC698011	R	water	12-21-96	X	
35BO0301	MC698012		soil	12-21-96	X	
35BO0302	MC698013		soil	12-21-96	X	
35BO0303	MC698014		soil	12-21-96	X	
35BO0302D	MC698015	FD	soil	12-21-96	X	
35BO0203D	MC698016	FD	soil	12-21-96	X	
35BO0203MS	MC698010MS	MS	soil	12-21-96	X	
35BO0203MSD	MC698010MSD	MSD	soil	12-21-96	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF040 | **VALIDATION SAMPLE TABLE** | **LDC#: 2120A**

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#: 7560-32**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)
35TO4301	MC783001	TB	water	1-7-97	X
35BO0401	MC783002		soil	1-7-97	X
35BO0402	MC783003		soil	1-7-97	X
35BO0403	MC783004		soil	1-7-97	X
35BO0501	MC783005		soil	1-7-97	X
35BO0501DL	MC783005DL		soil	1-7-97	X
35BO0502	MC783006		soil	1-7-97	X
35BO0503	MC783007		soil	1-7-97	X
35BO0201	MC783008		soil	1-8-97	X
35BO0202	MC783009		soil	1-8-97	X
35BO0203	MC783010		soil	1-8-97	X
35BO0101	MC783011		soil	1-8-97	X
35BO0102	MC783012		soil	1-8-97	X
35BO0103	MC783013		soil	1-8-97	X
35BO0301	MC783014		soil	1-9-97	X
35BO0302	MC783015		soil	1-9-97	X
35BO0303	MC783016		soil	1-9-97	X
35R02801	MC783017	R	water	1-9-97	X
35BO0203D	MC783018	FD	soil	1-8-97	X
35BO0103D	MC783019	FD	soil	1-8-97	X
35BO0203MS	MC783010MS	MS	soil	1-8-97	X
35BO0203MSD	MC783010MSD	MSD	soil	1-8-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF041 **VALIDATION SAMPLE TABLE** **LDC#: 2323A**

Project Name: NAS Whiting Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	Pesticides /PCBs (1.9)	Metals (2.1)
35T04501	MD908001	TB	water	6-11-97	X			
35F00301	MD908002		water	6-11-97	X	X	X	X
35R03001	MD908003	R	water	6-11-97	X	X	X	X
35G00101	MD908004		water	6-11-97	X	X	X	X
35G00101D	MD908005	FD	water	6-11-97	X	X	X	X
35G00101DRE	MD908005RE	FD	water	6-11-97		X		
35G00103	MD908006		water	6-11-97	X	X	X	X
35G00103F	MD908007		water	6-11-97				X
35G00102	MD908008		water	6-12-97	X	X	X	X
37G00102	MD908009		water	6-12-97	X	X	X	X
37T04601	MD926001	TB	water	6-12-97	X			
36G00101	MD926002		water	6-12-97	X	X	X	X
36G00101F	MD926003		water	6-12-97				X
37G00101	MD926004		water	6-12-97	X	X	X	X
36G00102	MD926005		water	6-13-97	X	X	X	X
36G00102RE	MD926005RE		water	6-13-97		X		
36G00103	MD926006		water	6-13-97	X	X	X	X
36G00103RE	MD926006RE		water	6-13-97		X		
35T04701	MD950001	TB	water	6-15-97	X			
35G00202	MD950002		water	6-15-97	X	X	X	X
35G00202D	MD950003	FD	water	6-15-97	X	X	X	X
35G00203	MD950004		water	6-15-97	X	X	X	X
35G00201	MD950005		water	6-16-97	X	X	X	X
35G00201F	MD950006		water	6-16-97				X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF041					VALIDATION SAMPLE TABLE			LDC#: 2323A
Project Name: NAS Whiting					Parameters/Analytical Method			
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**	**SVOA (1.9)**	**Pesticides /PCBs (1.9)**	**Metals (2.1)**
13T04801	MD985001	TB	water	6-16-97	X			
13G00301	MD985002		water	6-16-97	X	X	X	X
13G00301F	MD985003		water	6-16-97				X
13G00401	MD985004		water	6-16-97	X	X	X	X
35G00101MS	MD908004MS	MS	water	6-11-97	X	X	X	X
35G00101MSD	MD908004MSD	MSD	water	6-11-97	X	X	X	
35G00101DUP	MD908004DUP	DUP	water	6-11-97				X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

ble 1

SDG#: WF042				VALIDATION SAMPLE TABLE	LDC#: 2311A
Project Name: NAS Whiting				Parameters/Analytical Method	
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**
05T04901	ME007001	TB	water	6-18-97	X
05G00301	ME007002		water	6-17-97	X
05G00901	ME007003		water	6-18-97	X
05G00902	ME007004		water	6-19-97	X
05G00902D	ME007005	FD	water	6-19-97	X
05R03101	ME007006	R	water	6-17-97	X
05T05001	ME021001		water	6-20-97	X
05G01001	ME021002		water	6-20-97	X
05G01002	ME021003		water	6-20-97	X
05G00902MS	ME007004MS	MS	water	6-19-97	X
05G00902MSD	ME007004MSD	MSD	water	6-19-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF043 — **VALIDATION SAMPLE TABLE** — **LDC#: 2315A**

Project Name: NAS Whiting — Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)
05T05101	ME042001	TB	water	6-23-97	X
05R03201	ME042002	R	water	6-23-97	X
05G00801	ME042003		water	6-24-97	X
05G00802	ME042004		water	6-24-97	X
05G00802D	ME042005	FD	water	6-24-97	X
33T05201	ME053001	TB	water	6-24-97	X
33G00501	ME053002		water	6-24-97	X
33G00101	ME053003		water	6-24-97	X
33G00201	ME053004		water	6-25-97	X
33G00301	ME053005		water	6-25-97	X
33G00301DL	ME053005DL		water	6-25-97	X
33T05301	ME073001	TB	water	6-25-97	X
06G00102	ME073002		water	6-26-97	X
06G00301	ME073003		water	6-26-97	X
33G00401	ME073004		water	6-26-97	X
30T05401	ME087001	TB	water	6-26-97	X
07G00101	ME087002		water	6-26-97	X
07G00101D	ME087003	FD	water	6-26-97	X
30G00501	ME087004		water	6-26-97	X
30G00301	ME087005		water	6-27-97	X
30G00401	ME087006		water	6-27-97	X
05G00802MS	ME042004MS	MS	water	6-24-97	X
05G00802MSD	ME042004MSD	MSD	water	6-24-97	X

= Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF044 | **VALIDATION SAMPLE TABLE** | **LDC#: 2322A**

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)
06T05501	ME100001	TB	water	6-29-97	X
06R03301	ME100002	R	water	6-29-97	X
66G00201	ME100003		water	6-29-97	X
06G00101	ME100004		water	6-29-97	X
66G00202	ME100005		water	6-30-97	X
66T05601	ME110001	TB	water	6-30-97	X
66G01201	ME110002		water	6-30-97	X
66G01201D	ME110003	FD	water	6-30-97	X
66G00102	ME110004		water	7-1-97	X
66G01301	ME110005		water	7-1-97	X
66T05701	ME133001	TB	water	7-2-97	X
66G00401	ME133002		water	7-2-97	X
66G02001	ME133003		water	7-2-97	X
66T05801	ME135001	TB	water	7-2-97	X
66G00603	ME135002		water	7-2-97	X
66G00603D	ME135003	FD	water	7-2-97	X
66G00604	ME135004		water	7-2-97	X
66G00601	ME135005		water	7-3-97	X
66G00602	ME135006		water	7-3-97	X
66G01201MS	ME110002MS	MS	water	6-30-97	X
66G01201MSD	ME110002MSD	MSD	water	6-30-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF045 — **VALIDATION SAMPLE TABLE** — **LDC#: 2345A**

Project Name: NAS Whiting — Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	Pesticides /PCBs (1.9)	Metals (2.1)	Cyanide
OWT05901	ME149001	TB	water	7-7-97	X				
OWR03401	ME149002	R	water	7-7-97	X	X	X	X	X
OWG00501	ME149003		water	7-8-97	X	X	X	X	X
OWG00502	ME149004		water	7-8-97	X	X	X	X	X
OWG00502D	ME149005	FD	water	7-8-97	X	X	X	X	X
OWG00503	ME149006		water	7-8-97	X	X	X	X	X
OWG00503F	ME149007		water	7-8-97				X	
OWT06001	ME159001	TB	water	7-8-97	X				
OWG00101	ME159002		water	7-9-97	X	X	X	X	X
OWG00101RE	ME159002RE		water	7-9-97		X			
OWG00102	ME159003		water	7-9-97	X	X	X	X	X
OWG00102RE	ME159003RE		water	7-9-97		X			
OWG00103	ME159004		water	7-9-97	X	X	X	X	X
OWG00103RE	ME159004RE		water	7-9-97		X			
66T06101	ME175001	TB	water	7-9-97	X				
66G02301	ME175002		water	7-9-97	X	X	X	X	X
66G02301RE	ME175002RE		water	7-9-97		X			
66G02302	ME175003		water	7-9-97	X	X	X	X	X
66G02303	ME175004		water	7-10-97	X	X	X	X	X
OWT06201	ME190001	TB	water	7-10-97	X				
OWG00302	ME190002		water	7-10-97	X	X	X	X	X
OWG00302D	ME190003	FD	water	7-10-97	X	X	X	X	X
OWG00303	ME190004		water	7-10-97	X	X	X	X	X
OWG00301	ME190005		water	7-11-97	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF045 | **VALIDATION SAMPLE TABLE** | **LDC#: 2345A**

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	Pesticides /PCBs (1.9)	Metals (2.1)	Cyanide
OWG00301F	ME190006		water	7-11-97				X	
OWT06401	ME226001	TB	water	7-14-97	X				
OWT06401DL	ME226001DL		water	7-14-97	X				
OWG00401	ME226002		water	7-14-97	X	X	X	X	X
OWG00201	ME226003		water	7-15-97	X	X	X	X	X
OWG00502MS	ME149004MS	MS	water	7-8-97	X	X	X	X	X
OWG00502MSD	ME149004MSD	MSD	water	7-8-97	X	X	X		
OWG00502DUP	ME149004DUP	DUP	water	7-8-97				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF046					VALIDATION SAMPLE TABLE				LDC#: 2377A
Project Name: NAS Whiting					Parameters/Analytical Method				
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**	**SVOA (1.9)**	**Pesticides /PCBs (1.9)**	**Metals (4.0)**	**Cyanide**
OWT06501	ME241001	TB	water	7-15-97	X				
31R03301	ME241002	R	water	7-15-97	X	X	X	X	X
31G00101	ME241003		water	7-15-97	X	X	X	X	X
31G00101D	ME241004	FD	water	7-15-97	X	X	X	X	X
OWT06601	ME261001	TB	water	7-16-97	X				
31G00401	ME261002		water	7-16-97	X	X	X	X	X
31G00402	ME261003		water	7-16-97	X				
31G00403	ME261004		water	7-16-97	X				
31G00301	ME261005		water	7-16-97	X				
31T06701	ME305001	TB	water	7-21-97	X				
31G00201	ME305002		water	7-21-97	X				
31G00101MS	ME241003MS	MS	water	7-15-97	X	X	X	X	
31G00101MSD	ME241003MSD	MSD	water	7-15-97	X	X	X		
31G00101DUP	ME241003DUP	DUP	water	7-15-97				X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF047					VALIDATION SAMPLE TABLE	LDC#: 2346A
Project Name: NAS Whiting					Parameters/Analytical Method	
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA OLV01.0**	**Metals (2.1)**
39W028	ME243001		water	7-15-97	X	
39W027	ME243002		water	7-15-97	X	
39W024	ME243003		water	7-15-97	X	
39W032	ME243004		water	7-15-97	X	X
39W034	ME243005		water	7-15-97	X	X
39W034D	ME243006		water	7-15-97	X	X
39W031	ME243007		water	7-15-97	X	
STOR_BLK	ME243008		water	7-17-97	X	
39T10001	ME244001	TB	water	7-15-97	X	
39W001	ME244002		water	7-15-97	X	
39W002	ME244003		water	7-15-97	X	X
39W003	ME244004		water	7-15-97	X	
39W004	ME244005		water	7-15-97	X	
39W005	ME244006		water	7-15-97	X	
39W006	ME244007		water	7-15-97	X	
39W007	ME244008		water	7-15-97	X	
39W008	ME244009		water	7-15-97	X	
39W014	ME267001		water	7-16-97	X	
39W015	ME267002		water	7-16-97	X	
39W016	ME267003		water	7-16-97	X	X
39W012	ME267004		water	7-16-97	X	
39W012D	ME267005	FD	water	7-16-97	X	
39W013	ME267006		water	7-16-97	X	
39W017	ME267007		water	7-16-97	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1						
SDG#: WF047			**VALIDATION SAMPLE TABLE**			**LDC#: 2346A**
Project Name: NAS Whiting			Parameters/Analytical Method			
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA OLV01.0**	**Metals (2.1)**
STOR_BLK2	ME267008		water	7-18-97	X	
39W034MS	ME243005MS	MS	water	7-15-97	X	X
39W034MSD	ME243005MSD	MSD	water	7-15-97	X	
39W034DUP	ME243005DUP	DUP	water	7-15-97		X

Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Ma' 'pike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF048				VALIDATION SAMPLE TABLE	LDC#: 2338A
Project Name: NAS Whiting					Parameters/Analytical Method
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**
39D002	ME245001		soil	7-15-97	X
39D001	ME245002		soil	7-15-97	X
39D007	ME245003		soil	7-15-97	X
39D023	ME264001		soil	7-16-97	X
39D026	ME264002		soil	7-16-97	X
39D016	ME264003		soil	7-16-97	X
39D013	ME264004		soil	7-16-97	X
39D019	ME264005		soil	7-17-97	X
39D018	ME264006		soil	7-17-97	X
39D018D	ME264007	FD	soil	7-17-97	X
39D022	ME264008		soil	7-17-97	X
39R03401	ME264009	R	water	7-16-97	X
39D018MS	ME264006MS	MS	soil	7-17-97	X
39D018MSD	ME264006MSD	MSD	soil	7-17-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF049 | **VALIDATION SAMPLE TABLE** | **LDC#: 2347A**

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)
39T10201	ME262001	TB	water	7-15-97	X	
39W023	ME262002		water	7-16-97	X	
39W026	ME262003		water	7-16-97	X	
39W025	ME262004		water	7-16-97	X	
39W029	ME262005		water	7-16-97	X	
39W030	ME262006		water	7-16-97	X	
39U001	ME262007		water	7-16-97	X	X
39W018	ME263001		water	7-17-97	X	
39W019	ME263002		water	7-17-97	X	
39W020	ME263003		water	7-17-97	X	
39W021	ME263004		water	7-17-97	X	
39W021D	ME263005	FD	water	7-17-97	X	
39W022	ME263006		water	7-17-97	X	
39T10401	ME263007	TB	water	7-17-97	X	
39W021MS	ME263004MS	MS	water	7-17-97	X	
39W021MSD	ME263004MSD	MSD	water	7-17-97	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

ble 1

SDG#: WF051 — VALIDATION SAMPLE TABLE — LDC#: 2360A

Project Name: NAS Whiting — Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (CLP)
16T06801	ME306001	TB	water	7-21-97	X	
16R03501	ME306002	R	water	7-21-97	X	
16G00401	ME306003		water	7-22-97	X	
16G00401D	ME306004	FD	water	7-22-97	X	
16G00402	ME306005		water	7-22-97	X	
16G00403	ME306006		water	7-22-97	X	
16T06901	ME322001	TB	water	7-22-97	X	
16G00302	ME322002		water	7-22-97	X	X
16G00303	ME322003		water	7-22-97	X	X
16G00202	ME322004		water	7-23-97	X	X
16G00203	ME322005		water	7-23-97	X	X
16T07001	ME340001	TB	water	7-23-97	X	
16G00601	ME340002		water	7-23-97	X	X
16G00601F	ME340003		water	7-23-97		X
16G00602	ME340004		water	7-23-97	X	X
16R03601	MW340005	R	water	7-23-97		X
16G00304	ME340006		water	7-24-97	X	X
16G00304F	ME340007		water	7-24-97		X
16G00301	ME340008		water	7-24-97	X	X
16G00101	ME340009		water	7-24-97	X	X
16G00101D	ME340010	FD	water	7-24-97	X	X
16T07101	ME348001	TB	water	7-25-97	X	
16G00702	ME348002		water	7-25-97	X	X
16G00702DL	ME348002DL		water	7-25-97	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF051					VALIDATION SAMPLE TABLE	LDC#: 2360A
Project Name: NAS Whiting					Parameters/Analytical Method	
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**	**Metals (CLP)**
16G00703	ME348003		water	7-25-97	X	X
16G00703DL	ME348003DL		water	7-25-97	X	
16G00701	ME348004		water	7-25-97	X	X
16G00401MS	ME306003MS	MS	water	7-22-97	X	
16G00401MSD	ME306003MSD	MSD	water	7-22-97	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF052					VALIDATION SAMPLE TABLE LDC#: 2354A
Project Name: NAS Whiting					Parameters/Analytical Method
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (OLV01.0)**
39018	ME346001		water	7-25-97	X
39019	ME346002		water	7-25-97	X
39020	ME346003		water	7-25-97	X
39021	ME346004		water	7-25-97	X
39020D	ME346005	FD	water	7-25-97	X
39029	ME346006		water	7-25-97	X
39T10501	ME346007	TB	water	7-25-97	X
STORAGEBLK	ME346008		water	7-26-97	X
39020MS	ME346003MS	MS	water	7-25-97	X
39020MSD	ME346003MSD	MSD	water	7-25-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF053 | **VALIDATION SAMPLE TABLE** | **LDC#: 2384A**

Project Name: NAS Whiting | Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (2.1)
15T07201	ME367001	TB	water	7-27-97	X	
15R03701	ME367002	R	water	7-27-97	X	X
15G00601	ME367003		water	7-27-97	X	X
15G00602	ME367004		water	7-27-97	X	X
15G00602D	ME367005	FD	water	7-27-97	X	X
15T07301	ME377001	TB	water	7-28-97	X	
15G00201	ME377002		water	7-28-97	X	X
15G00101	ME377003		water	7-28-97	X	X
15G00202	ME377004		water	7-29-97	X	X
15G00203	ME377005		water	7-29-97	X	X
15T07401	ME390001	TB	water	7-29-97	X	
15G00301	ME390002		water	7-29-97	X	X
15G00302	ME390003		water	7-29-97	X	X
15G00701	ME390004		water	7-30-97	X	X
15G00702	ME390005		water	7-30-97	X	X
15T07501	ME404001	TB	water	7-30-97	X	
15G00401	ME404002		water	7-30-97	X	X
15G00703	ME404003		water	7-30-97	X	X
15G00703D	ME404004	FD	water	7-30-97	X	X
15G00501	ME404005		water	7-31-97	X	X
15G00501F	ME404006		water	7-31-97		X
15G00502	ME404007		water	7-31-97	X	X
15G00503	ME404008		water	7-31-97	X	X
15G00602MS	ME367004MS	MS	water	7-27-97	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF053					VALIDATION SAMPLE TABLE	LDC#: 2384A
Project Name: NAS Whiting					Parameters/Analytical Method	
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**	**Metals (2.1)**
15G00602MSD	ME367004MSD	MSD	water	7-27-97	X	
15G00602DUP	ME367004DUP	DUP	water	7-27-97		X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF054 **VALIDATION SAMPLE TABLE** **LDC#: 2399A**

Project Name: NAS Whiting Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (2.1)
15T07601	ME441001	TB	water	8-4-97	X	
15G00801	ME441002		water	8-4-97	X	X
15G00801D	ME441003	FD	water	8-4-97	X	X
15G00802	ME441004		water	8-4-97	X	X
15R03801	ME441005	R	water	8-5-97	X	X
15G00803	ME441006		water	8-5-97	X	X
15G00303	ME441007		water	8-5-97	X	X
30T07701	ME450001	TB	water	8-5-97	X	
30R03901	ME450002	R	water	8-6-97	X	X
30G00302	ME450003		water	8-6-97	X	X
15G00801MS	ME441002MS	MS	water	8-4-97	X	X
15G00801MSD	ME441002MSD	MSD	water	8-4-97	X	
15G00801DUP	ME441002DUP	DUP	water	8-4-97		X

Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF055		VALIDATION SAMPLE TABLE			LDC#: 2511A
Project Name: NAS Whiting		Parameters/Analytical Method			
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**
OWT08001	MF004001	TB	water	10-27-97	X
OWR04101	MF004002	R	water	10-27-97	X
OWG00401	MF004003		water	10-27-97	X
OWG00401D	MF004004		water	10-27-97	X
13R04201	MF004005	R	water	10-28-97	X
13G00401	MF004006		water	10-28-97	X
OWG00401MS	MF004003MS	MS	water	10-27-97	X
OWG00401MSD	MF004003MSD	MSD	water	10-27-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table II
Summary of Rejected Data (Organics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	**Fraction**	**Sample**	**Compound**	**Reason**
WF022	Volatiles Semivolatiles Pesticides & PCBS	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF023	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF024	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF025	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF026	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF027	Volatiles	16G00501 16G00501D 16R01501 66G02101 66G02103 66T02001	2-Butanone 2-Butanone 2-Butanone 2-Butanone 2-Butanone 2-Butanone	Initial & Continuing Calibration (RRF)
	Semivolatiles Pesticides & PCBs	All samples All samples	No rejected results No rejected results	- -
WF028	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF029	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF030	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF031	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF031B	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF032	Volatiles Semivolatiles	All samples All samples	No rejected results No rejected results	- -
	Pesticides & PCBs	29G00501 29G00501D	Heptachlor epoxide Heptachlor epoxide	Target compound identification (RT)
WF033	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF034	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF035	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -

Table II
Summary of Rejected Data (Organics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	**Fraction**	**Sample**	**Compound**	**Reason**
WF036	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF037	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF038	Volatiles	All samples	No rejected results	-
WF039	Volatiles	All samples	No rejected results	-
WF040	Volatiles	All samples	No rejected results	-
WF041	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF042	Volatiles	All samples	No rejected results	-
WF043	Volatiles	All samples	No rejected results	-
WF044	Volatiles	All samples	No rejected results	-
WF045	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF046	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF047	Volatiles	39T10001	Acetone & 2-Butanone	Initial & Continuing Calibration (RRF)
		39W001	Acetone & 2-Butanone	
		39W002	Acetone & 2-Butanone	
		39W003	Acetone & 2-Butanone	
		39W004	Acetone & 2-Butanone	
		39W005	Acetone & 2-Butanone	
		39W006	Acetone & 2-Butanone	
		39W007	Acetone & 2-Butanone	
		39W008	2-Butanone	
		39W012	Acetone & 2-Butanone	
		39W012D	Acetone & 2-Butanone	
		39W013	Acetone & 2-Butanone	
		39W014	Acetone & 2-Butanone	
		39W015	Acetone & 2-Butanone	
		39W016	Acetone & 2-Butanone	
		39W017	Acetone & 2-Butanone	
		39W024	2-Butanone	
		39W027	2-Butanone	
		39W028	2-Butanone	
		39W031	2-Butanone	
		39W032	Acetone & 2-Butanone	
		39W034	2-Butanone	
		39W034D	Acetone & 2-Butanone	
		STOR_BLK	2-Butanone	
		STOR_BLK2	2-Butanone	
WF048	Volatiles	All samples	No rejected results	-

Table II
Summary of Rejected Data (Organics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Fraction	Sample	Compound	Reason
WF049	Volatiles	39T10201	Acetone & 2-Butanone	Initial & Continuing calibration (RRF)
		39T10401	Acetone & 2-Butanone	
		39W016	Acetone	
		39W019	2-Butanone	
		39W020	Acetone & 2-Butanone	
		39W021	Acetone & 2-Butanone	
		39W021D	Acetone & 2-Butanone	
		39W022	Acetone & 2-Butanone	
		39W023	Acetone & 2-Butanone	
		39W025	Acetone & 2-Butanone	
		39W025	Acetone & 2-Butanone	
		39W029	2-Butanone	
		39W030	2-Butanone	
WF049	Semivolatiles	All samples	No rejected results	-
WF051	Volatiles	All samples	No rejected results	-
WF052	Volatiles	39G018	Acetone & 2-Butanone	Initial & Continuing Calibration (RRF)
		39G019	Acetone & 2-Butanone	
		39G020	Acetone & 2-Butanone	
		39G020D	Acetone & 2-Butanone	
		39G021	Acetone & 2-Butanone	
		39G029	Acetone & 2-Butanone	
		39R10501	Acetone & 2-Butanone	
		STORAGE BLK	Acetone	
WF053	Volatiles	All samples	No rejected results	-
WF054	Volatiles	All samples	No rejected results	-
WF055	Volatiles	All samples	No rejected results	-

Table III
Summary of Rejected Data (Inorganics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Fraction	Sample	Analyte	Reason
WF022	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF023	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF024	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF025	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF026	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF027	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF028	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF029	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF030	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF031	All metals	All samples	No rejected results	-
	Cyanide	05G00101 05G00301 05G00801 05G00802 05G00901 05G00902 05G01001 05G01001D 05G01002 05R01901 33G00101 33G00201 33G00301 33G00301D 33G00501	Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide	Matrix spike (%R)
WF031B	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF032	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF033	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF034	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF035	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF036	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF037	All metals	All samples	No rejected results	-
	Cyanide	15F00201	Cyanide	Matrix spike (%R)
WF041	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -

Table III
Summary of Rejected Data (Inorganics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes				
SDG	**Fraction**	**Sample**	**Analyte**	**Reason**
WF045	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF046	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF047	All metals	All samples	No rejected results	-
WF051	All metals	All samples	No rejected results	-
WF053	All metals	All samples	No rejected results	-
WF054	All metals	All samples	No rejected results	-

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF022	BKG00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Chloro-3-methylphenol	23-97	-	108	115	-	J (all detects)
		4-Nitrophenol	10-80	-	88	93	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	100	108	-	J (all detects)
		Pentachlorophenol	9-103	-	106	118	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF023	02G00301	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	88	82	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	97	-	-	J (all detects)
		Pentachlorophenol	9-103	-	139	122	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF024	15G00701	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	100	102	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	102	106	-	J (all detects)
		Pentachlorophenol	9-103	-	147	148	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF025	15G00601	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	99	102	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	101	103	-	J (all detects)
		Pentachlorophenol	9-103	-	124	130	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria % Recovery	Criteria RPD	% Recovery MS	% Recovery MSD	RPD	Qualifier
WF026	15G00803	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Chloro-3-methylphenol	23-97	-	99	-	-	J (all detects)
		4-Nitrophenol	10-80	-	108	114	-	J (all detects)
		Pentachlorophenol	9-103	-	140	144	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	-	100	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF027	16G00501	Volatiles						
		Benzene	-	≤11	-	-	12	J
		Semivolatiles						
		4-Nitrophenol	10-80	-	91	91	-	J (all detects)
		Pentachlorophenol	9-103	-	104	104	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF028	12G00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	83	-	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF029	14G00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	88	91	-	J (all detects)
		Pentachlorophenol	9-103	-	-	106	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF030	66G00601	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	85	89	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF031	05G01001	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		Phenol	-	≤42	-	-	50	None
		2-Chlorophenol	-	≤40	-	-	50	None
		4-Chloro-3-methylphenol	-	≤42	-	-	51	None
		4-Nitrophenol	10-80	≤50	-	95	58	None
		Pentachlorophenol	-	≤50	-	-	52	None
		1,4-Dichlorobenzene	-	≤28	-	-	45	J
		N-Nitroso-di-n-propylamine	-	≤38	-	-	56	J
		1,2,4-Trichlorobenzene	-	≤28	-	-	41	J
		Acenaphthene	-	≤31	-	-	84	J
		2,4-Dinitrotoluene	-	≤38	-	-	52	J
		Pyrene	-	≤31	-	-	54	J
		Pesticides/PCBs	-	-	-	-	-	None
WF031B	None	Volatiles	-	-	-	-	-	-
		Semivolatiles	-	-	-	-	-	-
		Pesticides/PCBs	-	-	-	-	-	-
WF032	29G00501	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		Pesticides/PCBs	-	-	-	-	-	None
WF033	66G00201	Volatiles						
		1,1-Dichloroethene	-	≤14	-	-	16	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	-	83	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF034	30G00301	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		Acenaphthene	46-118	≤31	44	-	37	None
		1,4-Dichlorobenzene	-	≤28	-	-	33	None
		1,2,4-Trichlorobenzene	-	≤28	-	-	34	None
		2,4-Dinitrotoluene	-	≤38	-	-	40	None
		Pyrene	-	≤31	-	-	36	None

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria % Recovery	Criteria RPD	% Recovery MS	% Recovery MSD	RPD	Qualifier
WF034 cont.	30G00301	Pesticides/PCBs	-	-	-	-	-	None
WF035	66G01701	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		Pesticides/PCBs	-	-	-	-	-	None
WF036	54G00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	101	81	-	None
		1,4-Dichlorobenzene	-	≤28	-	-	30	J
		1,2,4-Trichlorobenzene	-	≤28	-	-	36	J
		Pesticides/PCBs	-	-	-	-	-	None
WF037	15G00803	Volatiles	-	-	-	-	-	None
WF038	36BO0303	Volatiles	-	-	-	-	-	None
WF039	35BO0203	Volatiles	-	-	-	-	-	None
WF040	37BO0203	Volatiles	-	-	-	-	-	None
WF041	35G00101	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		Pesticides & PCBs						
		Aldrin	40-120	-	124	121	-	J (all detects)
WF042	05G00902	Volatiles	-	-	-	-	-	None
WF043	05G00802	Volatiles	-	-	-	-	-	None
WF044	66G01201	Volatiles						
		Trichloroethene	-	≤14	-	-	40	None
WF045	OWG00502	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	96	109	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	-	100	-	J (all detects)

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF045 cont.	OWG00502	Pesticides & PCBs						
		gamma-BHC	-	≤15	-	-	28	J
		Heptachlor	-	≤20	-	-	24	J
		Aldrin	40-120	≤22	-	128	29	J
		Dieldrin	52-126	≤18	-	134	22	J
		Endrin	56-121	≤21	-	144	22	J
WF046	31G00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	88	96	-	J (all detects)
		Pesticides & PCBs						
		Endrin	56-121	-	127	-	-	J (all detects)
WF047	39W034	Volatiles	-	-	-	-	-	None
WF048	39D018	Volatiles	-	-	-	-	-	None
WF049	39W021	Volatiles	-	-	-	-	-	None
	None	Semivolatiles	-	-	-	-	-	None
WF051	16G00401	Volatiles	-	-	-	-	-	None
WF052	39020	Volatiles	-	-	-	-	-	None
WF053	15G00602	Volatiles	-	-	-	-	-	None
WF054	15G00801	Volatiles	-	-	-	-	-	None
WF055	13G00401	Volatiles	-	-	-	-	-	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF022	**Client ID**	**BKG00101**	**BKG00101D**	
	Laboratory ID	**RB858003**	**RB858004**	
	Collection Date	**7/16/96**	**7/16/96**	
	Acetone	ND	8 ug/L	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides/PCBs	ND	ND	-
WF022	**Client ID**	**01G00102**	**01G00102D**	
	Laboratory ID	**RB873008**	**RB873009**	
	Collection Date	**7/19/96**	**7/19/96**	
	Acetone	4 ug/L	2 ug/L	67
	Semivolatiles	ND	ND	-
	Pesticides/PCBs	ND	ND	-
WF023	**Client ID**	**02G00301**	**02G00301D**	
	Laboratory ID	**RB887012**	**RB887013**	
	Collection Date	**7/24/96**	**7/24/96**	
	Acetone	ND	10 ug/L	Not calculable
	Carbon disulfide	1 ug/L	ND	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides/PCBs	ND	ND	-
WF024	**Client ID**	**15G00701**	**15G00701D**	
	Laboratory ID	**RB920009**	**RB920010**	
	Collection Date	**7/31/96**	**7/31/96**	
	Acetone	2	ND	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides/PCBs	ND	ND	-
WF025	**Client ID**	**15G00601**	**15G00601D**	
	Laboratory ID	**RB956006**	**RB956008**	
	Collection Date	**8/7/96**	**8/7/96**	
	Acetone	5 ug/L	8 ug/L	46
	1,2-Dichloroethene (total)	1 ug/L	1 ug/L	0
	Chlorobenzene	5 ug/L	5 ug/L	0
	Ethylbenzene	10U ug/L	1 ug/L	Not calculable
	1,4-Dichlorobenzene	12 ug/L	12 ug/L	0
	Naphthalene	4 ug/L	4 ug/L	0
	Diethylphthalate	1 ug/L	1 ug/L	0
	Pesticides/PCBs	ND	ND	-
WF026	**Client ID**	**15G00803**	**15G00803D**	
	Laboratory ID	**RB980007**	**RB980008**	
	Collection Date	**8/14/96**	**8/14/96**	
	Acetone	25 ug/L	5 ug/L	133
	2-Butanone	7 ug/L	10U ug/L	Not calculable
	Trichloroethene	4 ug/L	4 ug/L	0
	Bis(2-ethylhexyl)phthalate	2 ug/L	1 ug/L	67
	4,4'-DDT	0.16 ug/L	0.079 ug/L	68

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF026	**Client ID** **Laboratory ID** **Collection Date**	**16G00403** **RB980020** **8/16/96**	**16G00403D** **RB980021** **8/16/96**	
	Acetone 1,2-Dichloroethene (total) Benzene	3 ug/L 1 ug/L 600 ug/L	2 ug/L 2 ug/L 600 ug/L	40 67 0
	Phenol Naphthalene Bis(2-ethylhexyl)phthalate	8 ug/L 1 ug/L 1 ug/L	8 ug/L 2 ug/L 10U ug/L	0 67 Not calculable
	Pesticides/PCBs	ND	ND	None
WF026	**Client ID** **Laboratory ID** **Collection Date**	**16G00403DL** **RB980020DL** **8/16/96**	**16G00403DDL** **RB9890021DL** **8/16/96**	
	Acetone Benzene	18 ug/L 700 ug/L	24 ug/L 740 ug/L	29 6
WF027	**Client ID** **Laboratory ID** **Collection Date**	**16G00501** **RC016009** **8/21/96**	**16G00501D** **RC016013** **8/21/96**	
	Volatiles	ND	ND	None
	Bis(2-ethylhexyl)phthalate	2 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF027	**Client ID** **Laboratory ID** **Collection Date**	**09G00301** **RC016019** **8/23/96**	**09G00301D** **RC016020** **8/23/96**	
	Acetone 2-Butanone	46 ug/L 2 ug/L	18 ug/L 10U ug/L	88 Not calculable
	Semivolatiles Pesticides/PCBs	ND ND	ND ND	None None
WF028	**Client ID** **Laboratory ID** **Collection Date**	**11G00201** **RC044011** **8/28/96**	**11G00201D** **RC044018** **8/28/96**	
	Acetone	5 ug/L	11 ug/L	75
	Phenol Bis(2-ethylhexyl)phthalate	4 ug/L 5 ug/L	6 ug/L 4 ug/L	40 22
	Pesticides/PCBs	ND	ND	None
WF028	**Client ID** **Laboratory ID** **Collection Date**	**12G00101** **RC044012** **8/27/96**	**12G00101D** **RC044017** **8/27/96**	
	Acetone	3 ug/L	6 ug/L	67
	Bis(2-ethylhexyl)phthalate	2 ug/L	2 ug/L	0
	Pesticides/PCBs	ND	ND	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF029	**Client ID**	**14G00101**	**14G00101D**	
	Laboratory ID	**RC092007**	**RC092009**	
	Collection Date	**9/11/96**	**9/11/96**	
	Acetone	8 ug/L	4 ug/L	67
	Carbon disulfide	3 ug/L	10U ug/L	Not calculable
	Methylene chloride	1 ug/L	10U ug/L	Not calculable
	Bis(2-ethylhexyl)phthalate	4 ug/L	4 ug/L	0
	Pesticides/PCBs	ND	ND	None
WF030	**Client ID**	**66G00601**	**66G00601D**	
	Laboratory ID	**RC121007**	**RC121011**	
	Collection Date	**9/18/96**	**9/18/96**	
	Acetone	2 ug/L	8 ug/L	120
	Methylene chloride	2 ug/L	10U ug/L	Not calculable
	Bis(2-ethylhexyl)phthalate	2 ug/L	3 ug/L	40
	Pesticides/PCBs	ND	ND	None
WF030	**Client ID**	**66G02203**	**66G02203D**	
	Laboratory ID	**RC121016**	**RC121017**	
	Collection Date	**9/20/96**	**9/20/96**	
	Acetone	4 ug/L	10U ug/L	Not calculable
	Bis(2-ethylhexyl)phthalate	2 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF031	**Client ID**	**05G01001**	**05G01001D**	
	Laboratory ID	**MB928007**	**MB928012**	
	Collection Date	**9/25/96**	**9/25/96**	
	Volatiles	ND	ND	None
	Semivolatiles	ND	ND	None
	Pesticides/PCBs	ND	ND	None
WF031	**Client ID**	**33G00301**	**33G00301D**	
	Laboratory ID	**MB958006**	**MB958007**	
	Collection Date	**9/27/96**	**9/27/96**	
	1,1-Dichloroethene	5 ug/L	6 ug/L	18
	1,2-Dichloroethene (total)	4 ug/L	3 ug/L	29
	Trichloroethene	300 ug/L	300 ug/L	0
	Di-n-butylphthalate	1 ug/L	1 ug/L	0
	Pesticides/PCBs	ND	ND	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF032	**Client ID**	**29G00501**	**29G00501D**	
	Laboratory ID	**MC011007**	**MC011008**	
	Collection Date	**10/2/96**	**10/2/96**	
	Volatiles	ND	ND	None
	Semivolatiles	ND	ND	None
	Pesticides/PCBs	ND	ND	None
WF033	**Client ID**	**66G00201**	**66G00201D**	
	Laboratory ID	**MC118002**	**MC118003**	
	Collection Date	**10/9/96**	**10/9/96**	
	Trichloroethene	1 ug/L	1 ug/L	0
	Toluene	1 ug/L	1 ug/L	0
	Semivolatiles	ND	ND	None
	Pesticides/PCBs	ND	ND	None
WF034	**Client ID**	**30G00301**	**30G00301D**	
	Laboratory ID	**MC153005**	**MC153008**	
	Collection Date	**10/16/96**	**10/16/96**	
	1,2-Dichloroethene (total)	31 ug/L	31 ug/L	0
	Trichloroethene	340 ug/L	340 ug/L	0
	Di-n-butylphthalate	2 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF035	**Client ID**	**66G01701**	**66G01701D**	
	Laboratory ID	**MC214005**	**MC214007**	
	Collection Date	**10/23/96**	**10/23/96**	
	Volatiles	ND	ND	None
	Di-n-butylphthalate	3 ug/L	2 ug/L	40
	Pesticides/PCBs	ND	ND	None
WF036	**Client ID**	**54G00101**	**54G00101D**	
	Laboratory ID	**MC262004**	**MC262008**	
	Collection Date	**10/30/96**	**10/30/96**	
	Volatiles	ND	ND	None
	Diethylphthalate	1 ug/L	10U ug/L	Not calculable
	Di-n-butylphthalate	1 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF037	**Client ID**	**15G00803**	**15G00803D**	
	Laboratory ID	**MC424007**	**MC424008**	
	Collection Date	**11/20/96**	**11/20/96**	
	Trichloroethene	5 ug/L	5 ug/L	0
WF038	**Client ID**	**36BO0303**	**36BO0303D**	
	Laboratory ID	**MC687010**	**MC687011**	
	Collection Date	**12/17/96**	**12/17/96**	
	Volatiles	ND	ND	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF038	**Client ID**	**36BO0403**	**36BO0403D**	
	Laboratory ID	**MC687014**	**MC687015**	
	Collection Date	**12/18/96**	**12/18/96**	
	Volatiles	ND	ND	None
WF039	**Client ID**	**35BO0302**	**35BO0302D**	
	Laboratory ID	**MC698013**	**MC698015**	
	Collection Date	**12/21/96**	**12/21/96**	
	Volatiles	ND	ND	None
WF039	**Client ID**	**35BO0203**	**35BO0203D**	
	Laboratory ID	**MC698010**	**MC698016**	
	Collection Date	**12/21/96**	**12/21/96**	
	Volatiles	ND	ND	None
WF040	**Client ID**	**37BO0203**	**37BO0203D**	
	Laboratory ID	**MC783010**	**MC783018**	
	Collection Date	**1/8/97**	**1/8/97**	
	Acetone	14 ug/Kg	12 ug/Kg	15
	Methylene chloride	2 ug/Kg	10 ug/Kg	133
WF040	**Client ID**	**37BO0103**	**37BO0103D**	
	Laboratory ID	**MC783013**	**MC783019**	
	Collection Date	**1/8/97**	**1/8/97**	
	Acetone	18 ug/Kg	22 ug/Kg	20
	Methylene chloride	3 ug/Kg	11 ug/Kg	114
WF041	**Client ID**	**35G00101**	**35G00101D**	
	Laboratory ID	**MD908004**	**MD908005**	
	Collection Date	**6/11/97**	**6/11/97**	
	Volatiles			
	1,1-Dichloroethene	6 ug/L	7 ug/L	15
	1,1,1-Trichloroethane	2 ug/L	2 ug/L	0
	Xylene (total)	2 ug/L	1 ug/L	67
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF041	**Client ID**	**35G00202**	**35G00202D**	
	Laboratory ID	**MD950002**	**MD950003**	
	Collection Date	**6/15/97**	**6/15/97**	
	Volatiles			
	Chloroform	3 ug/L	3 ug/L	0
	Semivolatiles			
	Bis(2-ethylhexyl)phthalate	10U ug/L	5 ug/L	Not calculable
	Pesticides & PCBs	ND	ND	-
WF042	**Client ID**	**05G00902**	**05G00902D**	
	Laboratory ID	**ME007004**	**ME007005**	
	Collection Date	**6/19/97**	**6/19/97**	
	Volatiles	ND	ND	-

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF043	**Client ID**	**05G00802**	**05G00802D**	
	Laboratory ID	**ME042004**	**ME042005**	
	Collection Date	**6/24/97**	**6/24/97**	
	Volatiles			
	Benzene	1 ug/L	10U ug/L	Not calculable
	Trichloroethene	4 ug/L	10U ug/L	Not calculable
	Xylenes (total)	1 ug/L	10U ug/L	Not calculable
WF043	**Client ID**	**07G00101**	**07G00101D**	
	Laboratory ID	**ME087002**	**ME087003**	
	Collection Date	**6/26/97**	**6/26/97**	
	Acetone	540 ug/L	490 ug/L	10
	Benzene	3900 ug/L	4400 ug/L	12
	Toluene	14000 ug/L	16000 ug/L	13
	Ethylbenzene	1800 ug/L	2000 ug/L	10
	Xylenes, total	3200 ug/L	3600 ug/L	12
WF044	**Client ID**	**66G01201**	**66G01201D**	
	Laboratory ID	**ME110002**	**ME110003**	
	Collection Date	**6/30/97**	**6/30/97**	
	Volatiles			
	1,1-Dichloroethene	3 ug/L	2 ug/L	40
	1,2-Dichloroethene (total)	3 ug/L	3 ug/L	0
	Trichloroethene	120 ug/L	96 ug/L	22
WF044	**Client ID**	**66G00603**	**66G00603D**	
	Laboratory ID	**ME135002**	**ME135003**	
	Collection Date	**7/2/97**	**7/2/97**	
	Volatiles			
	Trichloroethene	1 ug/L	1 ug/L	0
WF045	**Client ID**	**OWG00502**	**OWG00502D**	
	Laboratory ID	**ME149004**	**ME149005**	
	Collection Date	**7/8/97**	**7/8/97**	
	Volatiles			
	Acetone	3 ug/Kg	2 ug/Kg	40
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF045	**Client ID**	**OWG00302**	**OWG00302D**	
	Laboratory ID	**ME190002**	**ME190003**	
	Collection Date	**7/10/97**	**7/10/97**	
	Volatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
	Semivolatiles			
	Di-n-butylphthalate	4 ug/L	6 ug/L	40
WF046	**Client ID**	**31G00101**	**31G00101D**	
	Laboratory ID	**ME241003**	**ME241004**	
	Collection Date	**7/15/97**	**7/15/97**	
	Volatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
	Semivolatiles			
	Di-n-butylphthalate	6 ug/L	3 ug/L	67

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF047	**Client ID**	39W034	39W034D	
	Laboratory ID	ME243005	ME243006	
	Collection Date	7/15/97	7/15/97	
	Volatiles			
	Acetone	4 ug/L	5U ug/L	Not calculable
	Carbon disulfide	1U ug/L	1 ug/L	Not calculable
WF047	**Client ID**	39W012	39W012D	
	Laboratory ID	ME267004	ME267005	
	Collection Date	7/16/97	7/16/97	
	Volatiles			
	Methylene chloride	2U ug/L	1 ug/L	Not calculable
	Benzene	2 ug/L	2 ug/L	0
WF048	**Client ID**	39D018	39D018D	
	Laboratory ID	ME264006	ME264007	
	Collection Date	7/17/97	7/17/97	
	Volatiles			
	Acetone	27 ug/Kg	27 ug/Kg	0
	Trichloroethene	2 ug/Kg	2 ug/Kg	0
WF049	**Client ID**	39W021	39W021D	
	Laboratory ID	ME263004	ME263005	
	Collection Date	7/17/97	7/17/97	
	Volatiles	ND	ND	-
WF051	**Client ID**	16G00401	16G00401D	
	Laboratory ID	ME306003	ME306003	
	Collection Date	7/22/97	7/22/97	
	Volatiles			
	Acetone	18 ug/L	14 ug/L	25
WF051	**Client ID**	16G00101	16G00101D	
	Laboratory ID	ME340009	ME340010	
	Collection Date	7/24/97	7/24/97	
	Volatiles	ND	ND	-
WF052	**Client ID**	39020	39020D	
	Laboratory ID	ME346004	ME346005	
	Collection Date	7/25/97	7/25/97	
	Volatiles	ND	ND	-
WF053	**Client ID**	15G00602	15G00602D	
	Laboratory ID	ME367004	ME367005	
	Collection Date	7/27/97	7/27/97	
	Volatiles			
	Trichloroethene	2 ug/L	2 ug/L	0
WF053	**Client ID**	15G00703	15G00703D	
	Laboratory ID	ME404003	ME404004	
	Collection Date	7/30/97	7/30/97	
	Volatiles			
	1,2-Trichloroethene (total)	1 ug/L	2 ug/L	67
	Trichloroethene	36 ug/L	38 ug/L	5
	1,1-Dichloroethene	2 ug/L	10U ug/L	Not calculable

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF054	**Client ID** **Laboratory ID** **Collection Date** <u>Volatiles</u> Chlorobenzene	15G00801 ME441002 8/4/97 4 ug/L	15G00801D ME441003 8/4/97 4 ug/L	0
WF055	**Client ID** **Laboratory ID** **Collection Date** Volatiles	OWG00401 MF004003 10/27/97 ND	OWG00401D MF004004 10/27/97 ND	-

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF022	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			10	
	BKR01001	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	58	60-150		J
	BKG00101	Tetrachloro-m-xylene	59	60-150		J
		Tetrachloro-m-xylene	57	60-150		J
	BKG00102	Decachlorobiphenyl	37	60-150		J
		Decachlorobiphenyl	37	60-150		J
	BKG00103	Decachlorobiphenyl	40	60-150		J
		Decachlorobiphenyl	41	60-150		J
	BKG00202	Decachlorobiphenyl	47	60-150		J
		Decachlorobiphenyl	47	60-150		J
	BKG00201	Decachlorobiphenyl	43	60-150		J
		Decachlorobiphenyl	43	60-150		J
	BKF01001	Tetrachloro-m-xylene	59	60-150		J
		Tetrachloro-m-xylene	59	60-150		J
		Decachlorobiphenyl	51	60-150		J
		Decachlorobiphenyl	47	60-150		J
	17G00101	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	56	60-150		J
	17G00201	Decachlorobiphenyl	22	60-150		J
		Decachlorobiphenyl	21	60-150		J
	01G00102D	Decachlorobiphenyl	59	60-150		J
		Decachlorobiphenyl	56	60-150		J
WF023	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			5	
	01G00201	Decachlorobiphenyl	32	60-150		J
		Decachlorobiphenyl	28	60-150		J
	01G00301	Decachlorobiphenyl	49	60-150		J
		Decachlorobiphenyl	47	60-150		J
	02G00101	Decachlorobiphenyl	41	60-150		J
		Decachlorobiphenyl	42	60-150		J
	16G00703	Decachlorobiphenyl	59	60-150		J
		Decachlorobiphenyl	55	60-150		J
	18G00301	Decachlorobiphenyl	48	60-150		J
		Decachlorobiphenyl	46	60-150		J

Table VI Summary of Surrogate Recoveries Groundwater and Subsurface Soil Investigation, Phase IIB NAS Whiting Field, Milton Florida						
Organic Compounds						
SDG	**Client ID**	**Compound**	**Percent Recovery**	**QC Limits**	**# of Samples**	**Qualifier**
WF024	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	BKG00203	Decachlorobiphenyl	52	60-150	-	J
		Decachlorobiphenyl	48	60-150	-	J
WF025	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			5	
	15G00101	Decachlorobiphenyl	21	60-150		J
		Decachlorobiphenyl	20	60-150		J
	15G00303	Tetrachloro-m-xylene	57	60-150		J
		Tetrachloro-m-xylene	58	60-150		J
	15G00502	Tetrachloro-m-xylene	155	60-150		J (all detects)
		Tetrachloro-m-xylene	162	60-150		J (all detects)
	15R01301	Decachlorobiphenyl	59	60-150		J
	15G00502RE	Decachlorobiphenyl	53	60-150		J
		Decachlorobiphenyl	54	60-150		J
WF026	All	Volatiles	All within QC limits	-	-	None
		Semivolatiles			2	
	15G00802	2-Fluorobiphenyl	161	43-116		J (all detects) all B/N
		Terphenyl-d14	163	33-141		J (all detects) all B/N
	15G00802R	2-Fluorobiphenyl	182	43-116		J (all detects) all B/N
		Terphenyl-d14	153	33-141		J (all detects) all B/N

Table VI Summary of Surrogate Recoveries Groundwater and Subsurface Soil Investigation, Phase IIB NAS Whiting Field, Milton Florida						
Organic Compounds						
SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF026 cont.		Pesticides/PCBs			9	
	15G00201	Decachlorobiphenyl	52	60-150		J
		Decachlorobiphenyl	50	60-150		J
	15G00202	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	58	60-150		J
	15G00801	Decachlorobiphenyl	43	60-150		J
		Decachlorobiphenyl	38	60-150		J
	15G00803	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	58	60-150		J
	16G00201	Decachlorobiphenyl	43	60-150		J
		Decachlorobiphenyl	37	60-150		J
	16G00203	Decachlorobiphenyl	44	60-150		J
		Decachlorobiphenyl	43	60-150		J
	16G00403	Decachlorobiphenyl	40	60-150		J
		Decachlorobiphenyl	39	60-150		J
	16G00403D	Decachlorobiphenyl	47	60-150		J
		Decachlorobiphenyl	46	60-150		J
	16G00601	Decachlorobiphenyl	25	60-150		J
		Decachlorobiphenyl	25	60-150		J
WF027	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			2	
	16G00304	Decachlorobiphenyl	46	60-150		J
		Decachlorobiphenyl	43	60-150		J
	66G02103	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	58	60-150		J
WF028	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			5	
	10G00101	Decachlorobiphenyl	50	60-150		J
		Decachlorobiphenyl	48	60-150		J
	11G00101	Decachlorobiphenyl	47	60-150		J
		Decachlorobiphenyl	47	60-150		J
	11G00301	Decachlorobiphenyl	25	60-150		J
		Decachlorobiphenyl	24	60-150		J
	11G00401	Decachlorobiphenyl	29	60-150		J
		Decachlorobiphenyl	29	60-150		J
	11G00201D	Decachlorobiphenyl	59	60-150		J

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF029	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			3	
	13G00101	Decachlorobiphenyl	23	60-150		J
		Decachlorobiphenyl	23	60-150		J
	66G00901	Decachlorobiphenyl	43	60-150		J
		Decachlorobiphenyl	42	60-150		J
	66G00903	Decachlorobiphenyl	52	60-150		J
		Decachlorobiphenyl	52	60-150		J
WF030	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	66G00804	Decachlorobiphenyl	31	60-150		J
		Decachlorobiphenyl	31	60-150		J
WF031	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			3	
	05G00301	Tetrachloro-m-xylene	56	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
	05G00101	Decachlorobiphenyl	164	60-150		J (all detects)
	05G01002	Tetrachloro-m-xylene	57	60-150		J
WF031B	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	All	Pesticides/PCBs	All within QC limits	-	-	None
WF032	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	29G00101	Pesticides/PCBs			1	
		Tetrachloro-m-xylene	54	60-150		J
		Tetrachloro-m-xylene	56	60-150		J

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF033	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			3	
	07G00101	Tetrachloro-m-xylene	174	60-150		J (all detects)
	30G00501	Tetrachloro-m-xylene	59	60-150		J
	66G00201D	Tetrachloro-m-xylene	25	60-150		J
		Tetrachloro-m-xylene	36	60-150		J
WF034	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	66G01801	Tetrachloro-m-xylene	164	60-150		J (all detects)
WF035	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	08G00101	Tetrachloro-m-xylene	59	60-150		J
WF036	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	54G00101	Tetrachloro-m-xylene	57	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
WF037	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	All	Pesticides/PCBs	All within QC limits	-	-	None
WF038	All	Volatiles	All within QC limits	-	-	None
WF039	All	Volatiles	All within QC limits	-	-	None
WF040	All	Volatiles	All within QC limits	-	-	None

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF041	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs			2	
	35G00201	Decachlorobiphenyl	58	60-150		J
	36G00103	Tetrachloro-m-xylene	57	60-150		J
		Tetrachloro-m-xylene	58	60-150		J
WF042	All	Volatiles	-	-	-	None
WF043	All	Volatiles	-	-	-	None
WF044	All	Volatiles	-	-	-	None
WF045	All	Volatiles	-	-	-	None
		Semivolatiles			3	
	OWG00101	2-Fluorophenol	0	21-110		J (all detects)
		Phenol-d5	0	10-110		R (all non-detects)
		2-Chlorophenol-d4	0	33-110		
		1,2-Dichlorobenzene-d4	0	16-110		
		Nitrobenzene-d5	0	35-114		
		2-Fluorobiphenyl	0	43-116		
		2,4,6-Tribromophenol	0	10-123		
		Terphenyl-d14	0	33-141		
	OWG00102	2-Fluorophenol	0	21-110		J (all detects)
		Phenol-d5	0	10-110		R (all non-detects)
		2-Chlorophenol-d4	0	33-110		
		1,2-Dichlorobenzene-d4	0	16-110		
		Nitrobenzene-d5	0	35-114		
		2-Fluorobiphenyl	0	43-116		
		2,4,6-Tribromophenol	0	10-123		
		Terphenyl-d14	0	33-141		

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF045 cont.	OWG00103	2-Fluorophenol	0	21-110		J (all detects)
		Phenol-d5	0	10-110		R (all non-detects)
		2-Chlorophenol-d4	0	33-110		
		1,2-Dichlorobenzene-d4	0	16-110		
		Nitrobenzene-d5	0	35-114		
		2-Fluorobiphenyl	0	43-116		
		2,4,6-Tribromophenol	0	10-123		
		Terphenyl-d14	0	33-141		
		Pesticides & PCBs			4	
	OWG00101	Tetrachloro-m-xylene	45	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
	OWG00103	Tetrachloro-m-xylene	59	60-150		J
	OWG00302	Tetrachloro-m-xylene	54	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
	OWG00302D	Tetrachloro-m-xylene	53	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
WF046	All	Volatiles	-	-	-	None
	All	Semivolatiles	-	-	-	None
		Pesticides & PCBs			2	
	31G00101	Tetrachloro-m-xylene	48	60-150		J
		Tetrachloro-m-xylene	55	60-150		J
	31R03301	Tetrachloro-m-xylene	59	60-150		J
WF047	All	Volatiles	-	-	-	None
WF048	All	Volatiles	-	-	-	None
WF049	All	Volatiles	-	-	-	None
	All	Semivolatiles	-	-	-	None
WF051	All	Volatiles	-	-	-	None
WF052	All	Volatiles	-	-	-	None
WF053	All	Volatiles	-	-	-	None
WF054	All	Volatiles	-	-	-	None

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF055	All	Volatiles	-	-	-	None

Notes: J = estimated value
UJ = undetected, but number that is reported as the quantification limit is an estimated value.

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF022		Volatiles			
	6/25/96	Acetone	30.2	-	J
	7/19/96	Chloromethane	-	28.8	J
		Chloroethane	-	48.7	J
	7/22/96	Chloroethane	-	30.6	J
		Semivolatiles			
	8/13/96	4,6-Dinitro-2-methylphenol	-	27.2	J
		Pentachlorophenol	-	25.4	J
	8/14/96	4-Chloroaniline	-	31.6	J
		2,4-Dinitrophenol	-	27.6	J
		4,6-Dinitro-2-methylphenol	-	33.8	J
	All	Pesticides/PCBs	-	-	None
WF023		Volatiles			
	6/25/96	Acetone	30.2	-	J
	7/25/96	Acetone	-	33.2	J
	7/31/96	Acetone	-	30.4	J
		Methylene chloride	-	31.7	J
		Carbon disulfide	-	27.2	J
	8/1/96	Chloroethane	-	27.5	J
		Carbon disulfide	-	27.5	J
		Methylene chloride	-	37.8	J
		Semivolatiles			
	8/20/96	4-Nitroaniline	-	37.8	J
		Chrysene	-	27.8	J
	8/21/96	4-Nitroaniline	-	31.5	J
		Chrysene	-	28.5	J
		Benzo(g,h,i)perylene	-	32.7	J
	8/25/96	4,4'-DDT	23.6	-	J
WF024		Volatiles			
	6/25/96	Acetone	30.2	-	J
	8/5/96	Acetone	33.8	-	J
	8/2/96	Chloroethane	-	29.5	J
		Carbon disulfide	-	30.8	J
		Methylene chloride	-	41.0	J
		Semivolatiles			
	8/21/96	4-Nitroaniline	-	28.7	J
		Chrysene	-	29.5	J
		Indeno(1,2,3-cd)pyrene	-	28.1	J
		Dibenz(a,h)anthracene	-	34.0	J
		Benzo(g,h,i)perylene	-	37.6	J
	All	Pesticides/PCBs	-	-	None

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF025		Volatiles			
	8/5/96	Acetone	33.8	-	J
	8/14/96	Chloromethane	26.7	-	J
		Chloroethane	28.5	-	J
		Acetone	29.7	-	J
		Semivolatiles			
	9/9/96	2,4-Dinitrophenol	-	29.9	J
		4-Nitroaniline	-	27.6	J
		4,6-Dinitro-2-methylphenol	-	30.7	J
		Pyrene	-	30.0	J
		3,3'-Dichlorobenzidine	-	37.0	J
		2,4-Dinitrophenol	-	35.6	J
		4-Nitroaniline	-	29.4	J
		4,6-Dinitro-2-methylphenol	-	32.0	J
		Pentachlorophenol	-	27.8	J
		3,3'-Dichlorobenzidine	-	27.8	J
	8/25/96	4,4'-DDT	23.6	-	J
WF026		Volatiles			
	8/5/96	Acetone	33.8	-	J
	8/19/96	Chloromethane	-	46.5	J
		Chloroethane	-	77.1	J
		1,1-Dichloroethane	-	28.6	J
		2-Butanone	-	30.3	J
	8/20/96	Chloromethane	-	32.5	J
		Chloroethane	-	32.4	J
	8/22/96	Acetone	-	37.9	J
		Carbon disulfide	-	28.0	J
		2-Butanone	-	27.8	J
		Semivolatiles			
	9/10/96	2,4-Dinitrophenol	-	35.6	J
		4-Nitroaniline	-	29.4	J
		4,6-Dinitro-2-methylphenol	-	32.0	J
		Pentachlorophenol	-	27.8	J
		3,3'-Dichlorobenzidine	-	27.8	J
	9/10/96	4-Chloroaniline	-	36.8	J
		3-Nitroaniline	-	37.9	J
		2,4-Dinitrophenol	-	29.3	J
		4-Nitroaniline	-	49.5	J
		4,6-Dinitro-2-methylphenol	-	29.4	J
		Pentachlorophenol	-	29.6	J
		3,3'-Dichlorobenzidine	-	54.1	J
		Pesticides & PCBs			
	9/14/96	alpha-BHC	22.2	-	J
		delta-BHC	22.1	-	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF027		Volatiles			
	9/1/96	2-Butanone	39.1	-	J
		2-Butanone	0.014 (RRF)	-	J(detects) / R(ND)
	8/5/96	Acetone	33.8	-	J
	9/2/96	Acetone	-	102.4	J
		2-Butanone	-	36.3	J
	8/22/96	Acetone	-	37.9	J
		Carbon disulfide	-	28.0	J
		2-Butanone	-	27.8	J
	8/29/96	Bromomethane	-	31.0	J
		Chloroethane	-	63.9	J
		Acetone	-	37.2	J
	9/2/96	Chloromethane	-	32.4	J
		Chloroethane	-	28.4	J
		Acetone	-	49.2	J
		2-Butanone	-	38.7	J
		4-Methyl-2-pentanone	-	35.7	J
		2-Hexanone	-	38.9	J
		2-Butanone	-	0.019 (RRF)	J (detects) / R (ND)
	9/3/96	Chloromethane	-	27.4	J
		Acetone	-	34.7	J
		2-Butanone	-	32.6	J
		4-Methyl-2-pentanone	-	32.9	J
		2-Hexanone	-	38.9	J
		Semivolatiles			
	9/10/96	4-Chloroaniline	-	36.8	J
		3-Nitroaniline	-	37.9	J
		2,4-Dinitrophenol	-	29.3	J
		4-Nitroaniline	-	49.5	J
		4,6-Dinitro-2-methylphenol	-	29.4	J
		Pentachlorophenol	-	29.6	J
		3,3'-Dichlorobenzidine	-	54.1	J
	9/20/96	3,3'-Dichlorobenzidine	-	30.4	J
	All	Pesticides/PCBs	-	-	None
WF028		Volatiles			
	8/5/96	Acetone	33.8	-	J
	9/2/96	Chloromethane	-	32.4	J
		Chloroethane	-	28.4	J
		Acetone	-	49.2	J
		2-Butanone	-	38.7	J
		4-Methyl-2-pentanone	-	35.7	J
		2-Hexanone	-	38.9	J
	9/3/96	Chloromethane	-	27.4	J
		Acetone	-	34.7	J
		2-Butanone	-	32.6	J
		4-Methyl-2-pentanone	-	32.9	J
		2-Hexanone	-	38.9	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF028 cont.	9/6/96	Chloromethane	-	35.4	J
		Acetone	-	41.0	J
		2-Butanone	-	41.8	J
		1,2-Dichloropropane	-	27.6	J
		4-Methyl-2-pentanone	-	40.5	J
		2-Hexanone	-	43.3	J
		Bromoform	-	26.2	J
		1,1,2,2-Tetrachloroethane	-	26.5	J
		Semivolatiles			
	9/20/96	3,3'-Dichlorobenzidine	-	30.4	J
	9/26/96	Benzo(k)fluoroanthene	-	28.5	J
	All	Pesticides/PCBs	-	-	None
WF029		Volatiles			
	9/17/96	Chloromethane	-	38.1	J
		Methylene chloride	-	33.6	J
	9/18/96	2-Hexanone	-	26.5	J
		Semivolatiles			
	9/26/96	Benzo(k)fluoranthene	-	28.5	J
	9/26/96	Benzo(k)fluoranthene	-	25.6	J
	All	Pesticides/PCBs	-	-	None
WF030		Volatiles			
	9/20/96	Methylene chloride	-	35.2	J
	9/23/96	Methylene chloride	-	30.2	J
		Semivolatiles			
	10/16/96	2,4-Dinitrophenol	-	25.8	J
		4-Nitrophenol	-	28.0	J
	All	Pesticides/PCBs	-	-	None
WF031	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
		Pesticides & PCBs			
	11/5/96	delta-BHC	21.2	-	J
WF031B	All	Volatiles	-	-	None
		Semivolatiles			
	11/28/96	Di-n-octylphthalate	-	25.3	J
		Pesticides & PCBs			
	12/9-10/97	Alpha-BHC	23.9	-	J
WF032		Volatiles			
	10/10/96	1,1,2,2-Tetrachloroethane	-	27.8	J
		Semivolatiles			
	11/3/96	Hexachlorobutadiene	-	33.5	J
		Hexachlorocyclopentadiene	-	31.5	J
		Di-n-octylphthalate	-	27.0	J
		Pesticides & PCBs			
	11/5/96	delta-BHC	21.2	-	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF033		Volatiles			
	10/16/96	Acetone	-	25.3	J
		Semivolatiles			
	11/4/96	Hexachlorobutadiene	-	31.2	J
		Hexachlorocyclopentadiene	-	27.9	J
	All	Pesticides/PCBs	-	-	None
WF034	All	Volatiles	-	-	None
		Semivolatiles			
	11/26/96	Di-n-octylptnalate	-	33.9	J
	All	Pesticides/PCBs	-	-	None
WF035	All	Volatiles	-	-	None
		Semivolatiles			
	11/26/96	Bis(2-ethylhexyl)phthalate	-	25.6	J
		Di-n-octylphthalate	-	32.1	J
	11/27/96	Di-n-octylphthalate	-	30.0	J
		Pesticides & PCBs			
	11/5/96	delta-BHC	21.2	-	J
WF036	All	Volatiles	-	-	None
		Semivolatiles			
		Di-n-octylphthalate	-	30.0	J
		Di-n-octylphthalate	-	25.3	J
		Pesticides & PCBs			
		alpha-BHC	23.9	-	J
WF037	All	Volatiles	-	-	None
		Semivolatiles			
	11/28/96	Di-n-octylphthalate	-	25.3	J
		Pesticides & PCBs			
	12/9-10/96	alpha-BHC	23.9	-	J
WF038		Volatiles			
	12/26/96	Acetone	-	30.6	J
WF039		Volatiles			
	12/26/96	Acetone	-	30.6	J
WF040	All	Volatiles	-	-	None
WF041	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
		Pesticides & PCBs			
	6/11-12/97	Methoxychlor	24.2	-	J
		delta-BHC	21.5	-	J
WF042	All	Volatiles	-	-	None
WF043	All	Volatiles	-	-	None

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF044		Volatiles			
	7/7/97	Bromomethane	-	33.5	J
WF045	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
		Pesticides & PCBs			
	7/31/97	alpha-BHC	20.3	-	J
		alpha-BHC	24.2	-	J
		gamma-BHC	21.9	-	J
WF046	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
		Pesticides & PCBs			
	7/31/97	alpha-BHC	20.3	-	J
		alpha-BHC	24.2	-	J
		gamma-BHC	21.9	-	J
WF047		Volatiles			
	7/21/97	Acetone	35.4	-	J
	7/21/97	Acetone	0.023 RRF	-	J (all detects) R (all non-detects)
		2-Butanone	0.030 RRF	-	J (all detects) R (all non-detects)
	7/28/97	Bromomethane	-	34.6	J
		Acetone	-	35.1	J
	7/29/97	Bromomethane	-	30.5	J
		Acetone	-	30.9	J
	7/21/97	Acetone	-	0.020 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.030 (RRF)	J (all detects) R (all non-detects)
	7/22/97	Acetone	-	0.020 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.030 (RRF)	J (all detects) R (all non-detects)
	7/28/97	Acetone	-	0.015 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.026 (RRF)	J (all detects) R (all non-detects)
	7/29/97	Acetone	-	0.015 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.026 (RRF)	J (all detects) R (all non-detects)
WF048		Volatiles			
	7/25/97	Bromomethane	36.5	-	J
	7/26/97	Bromomethane	-	28.7	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF049	7/21/97	Volatiles Acetone	35.4	-	J
	7/21/97	Acetone	0.023 (RRF)	-	J (all detects) R (all non-detects)
		2-Butanone	0.030 (RRF)	-	J (all detects) R (all non-detects)
	7/28/97	Bromomethane Acetone	- -	34.6 35.1	J J
	7/22/97	Acetone	-	0.020 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.030 (RRF)	J (all detects) R (all non-detects)
	7/28/97	Acetone	-	0.015 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.026 (RRF)	J (all detects) R (all non-detects)
	All	Semivolatiles	-	-	None
WF051	All	Volatiles	-	-	None
WF052	7/21/97	Volatiles Acetone	35.4	-	J
	7/21/97	Acetone	0.023 (RRF)	-	J (all detects) R (all non-detects)
		2-Butanone	0.030 (RRF)	-	J (all detects) R (all non-detects)
	7/29/97	Bromomethane Acetone	- -	30.5 30.9	J J
	7/29/97	Acetone	-	0.016 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.026 (RRF)	J (all detects) R (all non-detects)
WF053	8/8/97	Volatiles Acetone	-	36.4	J
WF054	8/19/97	Volatiles Acetone	39.1	-	J
	8/8/97	Acetone	-	36.4	J
	8/19/97	Acetone	-	30.3	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF055	All	Volatiles	-	-	None

Notes: %RSD = percent Relative Standard Deviation for initial calibrations

%D = percent Difference for continuing calibrations

J = the compound was positively identified: the associated numerical value is the approximate concentration of the compound in the sample, either because its concentration was lower than the QL (laboratory "J" flag), or because QC criteria were not met (validation "J").

UJ = the compound was not detected above the reported sample QL. However, the reported sample QL is approximate: the compound concentration may not reliably be presumed to be less than the QL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the compound cannot be verified.

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF022	Volatiles		BKT01001
	Acetone	8 ug/L	BKR01001
			BKG00101
			BKG00101D
			BKG00102
			BKG00103
	Methylene chloride	1 ug/L	BKG00202
	Acetone	16 ug/L	BKG00201
			BKF01001
	Acetone	14 ug/L	17T01101
			17G00102
			17G00101
			17G00201
			17G00301
			01G00101
			01G00102
			01G00102D
		ND	
	Semivolatiles	ND	-
	Pesticides/PCBs		-
WF023	Volatiles		01T01201
	Methylene chloride	2 ug/L	01G00401
	Acetone	15 ug/L	01G00201
			01G00301
			BKG00301
			02G00201
			02G00101
			18G00301
			02G00301
			02G00301D
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF024	Volatiles		18T01401
	Acetone	2 ug/L	18G00101
			15G00401
			BKG00203
			15R01201
			15G00701
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF025	Volatiles		15G00503DL
	Acetone	3 ug/L	15R01301
			15T01601
			15G00301
			15G00302
			15G00303
			15G00101
			15G00203
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF026	Volatiles		15T01701
	Acetone	11 ug/L	15G00202
			15G00201
			15G00802
			15G00801
			16G00201
			15G00803D
			15R01401
	Acetone	4 ug/L	15G00803
			16T01801
			16G00202
			16G00203
	Acetone	5 ug/L	16G00202DL
			16G00602
			16G00601
			16G00403
			16G00403DL
			16G00403D
			16G00403DDL
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF027	Volatiles		16G00401
	Acetone	5 ug/L	16G00402
			16G00101
			16G00301
	Acetone	5 ug/L	09G00301
	Acetone	6 ug/L	16G00501
	Trichloroethene	1 ug/L	16R01501
	Xylenes (total)	2 ug/L	16G00501D
			66T02001
			66G02101
			66G02103
	Acetone	11 ug/L	16G00303
			66G02102
			09G00101
			09G00301D
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF028	Volatiles		10T02101
	Acetone	5 ug/L	09G00201
			10G00201
			11G00102
			11G00401
			11T02201
			11G00301
	Acetone	11 ug/L	10G00101
			11G00402
			11G00201
			12G00201

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF028 cont.	Acetone Carbon disulfide	5 ug/L 6 ug/L	11G00101 12G00101 11R01601 12G00101D 11G00201D
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF029	Volatiles Acetone	 3 ug/L	13T02301 13G00101 13R01701
	Acetone	3 ug/L	13G00102 13G00201 13G00103 14G00201 14G00101 14G00101D 66T02401 66G00901 66G00904 66G00902 66G00903
	Semivolatiles Bis(2-ethylhexyl)phthalate	 1 ug/L	 All samples in SDG WF029
	Pesticides/PCBs	ND	-
WF030	Volatiles Acetone	 3 ug/L	66T02501 66G00801 66G00802 66G00803 66G00804
	Semivolatiles Bis(2-ethylhexyl)phthalate	 2 ug/L	 All samples in SDG WF030
	Pesticides/PCBs	ND	-
WF031	Volatiles	ND	-
	Semivolatiles Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	 3 ug/L 3 ug/L	 05G00801 05G00802 05G00901 05G00902
	Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	2 ug/L 2 ug/L	05G01001 05G00301 05R01901 05G01001D
	Di-n-butylphthalate	2 ug/L	05G00101 33G00501 33G00201 33G00101 33G00301 33G00301D
	Pesticides/PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF031B	Volatiles	ND	-
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF032	Volatiles	ND	-
	Semivolatiles		
	Di-n-butylphthalate	1 ug/L	33G00401 06G00102 06G00101 06G00301 06R02001 29G00501 29G00501D
	Di-n-butylphthalate	3 ug/L	29G00101 66G01201 66G00102
	Pesticides/PCBS	ND	-
WF033	Volatiles	ND	-
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF034	Volatiles	ND	-
	Semivolatiles		
	Bis(2-ethylhexyl)phthalate	2 ug/L	66G01101 66G01301 66G00501
	Pesticides/PCBs	ND	-
WF035	Volatiles	ND	-
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF036	Volatiles	ND	-
	Semivolatiles		
	Di-n-butylphthalate	2 ug/L	66G00701 54G00201 54G00101 31G00201 54R02401 54G00101D
	Pesticides/PCBs	ND	-
WF037	Volatiles	ND	-
	Semivolatiles		
	Di-n-butylphthalate	4 ug/L	All samples in SDG WF037
	Pesticides/PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF038	Volatiles Acetone	 7 ug/Kg	36BO0101 36BO0102 36BO0103 36BO0201 36BO0202 36BO0203 36BO0301 36BO0302 36BO0303 36BO0303D 36BO0401 36BO0402 36BO0403 36BO0403D
WF039	Volatiles Acetone Methylene chloride	 7 ug/Kg 4 ug/Kg	35BO0203D 35BO0102DL 35BO0105 35BO0201
WF040	Volatiles Acetone Bromomethane Acetone	 3 ug/L 2 ug/L 3 ug/Kg	All water samples in SDG WF040 35BO0402 35BO0501 35BO0501DL 35BO0502 37BO0201 37BO0202 37BO0101 37BO0102 37BO0103 37BO0301 37BO0302 37BO0303 37BO0203D 37BO0103D
WF041	Volatiles Pesticides & PCBs Semivolatiles Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	ND ND 1 ug/L 2 ug/L	- - 13G00301 13G00401
WF042	Volatiles	ND	-
WF043	Volatiles Acetone	 6 ug/L	 33T05301 06G00102 06G00301 33G00401
WF044	Volatiles Acetone	 3 ug/L	66T05601 66G01201 66G01201D 66G00102 66G01301

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF044 cont.	Acetone	11 ug/L	66T05701 66G00401 66G02001 66T05801 66G00603 66G00603D 66G00604 66G00601 66G00602
WF045	Volatiles Acetone	5ug/L	OWT05901 OWR03401 OWG00501 OWG00502 OWG00502D OWG00503 OWT06001 OWG00101 OWG00102 OWG00103 66T06101 66G02301 66G02302 66G02303
	Acetone	5 ug/L	OWT06201 OWG00302 OWG00302D OWG00303 OWG00301 OWT06401 OWT06401DL OWG00401 OWG00201
	Semivolatiles Di-n-butylphthalate	2 ug/L	OWR03401 OWG00501 OWG00502 OWG00502D OWG00503
	Phenol 2-Chlorophenol 1,4-Dichlorobenzene N-Nitroso-di-n-propylamine 1,2,4-Trichlorobenzene 4-Chloro-3-methylphenol Acenaphthylene Acenaphthene 4-Nitrophenol 2,4-Dinitrotoluene Pentachlorophenol Pyrene	72 ug/L 67 ug/L 33 ug/L 49 ug/L 36 ug/L 62 ug/L 12 ug/L 39 ug/L 69 ug/L 43 ug/L 65 ug/L 42 ug/L	OWG00101 OWG00102 OWG00103
	Di-n-butylphthalate	5 ug/L	66G02301 66G02302 66G02303
	Di-n-butylphthalate	4 ug/L	OWG00401 OWG00201
	Pesticides & PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF046	Volatiles 2-Butanone	4 ug/L	All samples in SDG WF046
	Semivolatiles Di-n-butylphthalate	3 ug/L	31R03301 31G00101 31G00101D
	Pesticides & PCBs	ND	-
WF047	Volatiles Acetone	4 ug/L	39W028 39W027 39W024 39W032 39W034D 39W031 39T10001 39W001 39W002 39W003 39W004 39W005
WF048	Volatiles 2-Butanone	4 ug/L	39R03401
	Acetone 2-Butanone	3 ug/Kg 4 ug/Kg	39D002 39D001 39D007 39D023 39D026 39D016 39D013 39D019 39D018 39D018D 39D022
WF049	Volatiles 2-Butanone	4 ug/L	39U001
	Semivolatiles	ND	-
WF051	Volatiles 2-Butanone	4 ug/L	16T06801 16R03501
WF052	Volatiles	ND	-
WF053	Volatiles Methylene chloride	8 ug/L	15G00602D 15T07501 15G00401 15G00703 15G00703D 15G00501 15G00502 15G00503
WF054	Volatiles Acetone	4 ug/L	30T07701 30R03901 30G00302

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	**Compound**	**Concentration**	**Associated Samples**
WF054 cont.	Methylene chloride	8 ug/L	15T07601 15G00801 15G00801D 15G00802 15R03801 15G00803 15G00303
WF055	Volatiles	ND	-

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF022	**Client ID:**	**BKF01001**		
	Laboratory ID:	**RB858010**		
	Collection Date:	**7/17/96**		
	Type:	**Source blank**		
	Volatiles			
	Acetone		4 ug/L	10U ug/L[1]
	Semivolatiles			
	Di-n-butylphthalate		6 ug/L	None
	Pesticides/PCBs		ND	None
WF022	**Client ID:**	**BKR01001**		
	Laboratory ID:	**RB858002**		
	Collection Date:	**7/16/96**		
	Type:	**Equipment rinsate**		
	Volatiles		ND	None
	Semivolatiles			
	Di-n-butylphthalate		5 ug/L	None
	Bis(2-ethylhexyl)phthalate		2 ug/L	None
	Pesticides/PCBs		ND	None
WF022	**Client ID:**	**BKT01001**		
	Laboratory ID:	**RB858001**		
	Collection Date:	**7/16/96**		
	Type:	**Trip blank**		
	Volatiles			
	Acetone		3 ug/L	10U ug/L[1]
WF022	**Client ID:**	**17T01101**		
	Laboratory ID:	**RB873001**		
	Collection Date:	**7/18/96**		
	Type:	**Trip blank**		
	Volatiles			
	Acetone		8 ug/L	10U ug/L[1]
WF023	**Client ID:**	**01R01101**		
	Laboratory ID:	**RB887005**		
	Collection Date:	**7/23/96**		
	Type:	**Equipment rinsate**		
	Volatiles			
	Acetone		4 ug/L	None
	Semivolatiles			
	Di-n-butylphthalate		6 ug/L	None
	Pesticides/PCBS		ND	None
WF023	**Client ID:**	**01T01201**		
	Laboratory ID:	**RB887001**		
	Collection Date:	**7/22/96**		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		2 ug/L	10U ug/L[1]
	Acetone		3 ug/L	10U ug/L[1]

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SDG	Parameter		Concentration	Qualifier
WF023	**Client ID:**	16T01301		
	Laboratory ID:	RB887014		
	Collection Date:	7/25/96		
	Type:	Trip blank		
	Volatiles			
	Acetone		2 ug/L	None
WF024	**Client ID:**	18T01401		
	Laboratory ID:	RB92001		
	Collection Date:	7/29/96		
	Type:	Trip blank		
	Volatiles			
	Methylene chloride		2 ug/L	None
	Acetone		4 ug/L	10U ug/L[1]
	Chloroform		1 ug/L	None
WF024	**Client ID:**	15R01201		
	Laboratory ID:	RB920005		
	Collection Date:	7/31/96		
	Type:	Equipment rinsate		
	Volatiles			
	Acetone		6 ug/L	10U ug/L[1]
	Semivolatiles			
	Di-n-butylphthalate		6 ug/L	None
	Pesticides/PCBs		ND	None
WF025	**Client ID:**	15R01301		
	Laboratory ID:	RB956011		
	Collection Date:	8/7/96		
	Type:	Equipment rinsate		
	Volatiles		ND	None
	Semivolatiles			
	Di-n-butylphthalate		6 ug/L	None
	Pesticides/PCBs		ND	None
WF025	**Client ID:**	15T01501		
	Laboratory ID:	RB956001		
	Collection Date:	8/5/96		
	Type:	Trip blank		
	Volatiles			
	Methylene chloride		2 ug/L	None
	Acetone		4 ug/L	None
WF025	**Client ID:**	15T01601		
	Laboratory ID:	RB956012		
	Collection Date:	8/8/96		
	Type:	Trip blank		
	Volatiles			
	Methylene chloride		1 ug/L	None
	Acetone		2 ug/L	10U ug/L

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Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF026	**Client ID:** 15T01701 **Laboratory ID:** RB980001 **Collection Date:** 8/12/96 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	1 ug/L	None
WF026	**Client ID:** 16T01801 **Laboratory ID:** RB980015 **Collection Date:** 8/15/96 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	1 ug/L	None
	Acetone	3 ug/L	10U ug/L[1]
WF026	**Client ID:** 15R01401 **Laboratory ID:** RB980012 **Collection Date:** 8/14/96 **Type:** Equipment rinsate		
	Volatiles		
	Acetone	6 ug/L	10U ug/L[1]
	Semivolatiles		
	Di-n-butylphthalate	6 ug/L	None
	Pesticides/PCBS	ND	None
WF027	**Client ID:** 16T01901 **Laboratory ID:** RC016001 **Collection Date:** 8/19/96 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	5 ug/L	None
	Acetone	6 ug/L	None
WF027	**Client ID:** 66T02001 **Laboratory ID:** RC016014 **Collection Date:** 8/22/96 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	3 ug/L	None
WF027	**Client ID:** 16R01501 **Laboratory ID:** RC016012 **Collection Date:** 8/21/96 **Type:** Equipment rinsate		
	Volatiles	ND	None
	Semivolatiles		
	Di-n-butylphthalate	5 ug/L	None
	Pesticides/PCBs	ND	None

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SDG	Parameter		Concentration	Qualifier
WF028	**Client ID:**	**11T02201**		
	Laboratory ID:	**RC044008**		
	Collection Date:	**8/28/96**		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		2 ug/L	None
	Acetone		8 ug/L	10U ug/L[1]
WF028	**Client ID:**	**10T02101**		
	Laboratory ID:	**RC044001**		
	Collection Date:	**8/26/96**		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		2 ug/L	None
WF028	**Client ID:**	**11R01601**		
	Laboratory ID:	**RC044016**		
	Collection Date:	**8/28/96**		
	Type:	**Equipment rinsate**		
	Volatiles			
	Acetone		9 ug/L	10U ug/L[1]
	Semivolatiles			
	Di-n-butylphthalate		5 ug/L	None
	Pesticides/PCBs		ND	None
WF029	**Client ID:**	**13R01701**		
	Laboratory ID:	**RC092008**		
	Collection Date:	**9/11/96**		
	Type:	**Equipment rinsate**		
	Volatiles			
	Acetone		3 ug/L	10U ug/L[1]
	Semivolatiles			
	Di-n-butylphthalate		5 ug/L	None
	Bis(2-ethylhexyl)phthalate		1 ug/L	10U ug/L[1]
	Pesticides/PCBs		ND	None
WF029	**Client ID:**	**13T02301**		
	Laboratory ID:	**RC092001**		
	Collection Date:	**9/9/96**		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		1 ug/L	None
	Acetone		2 ug/L	10U ug/L[1]
WF029	**Client ID:**	**66T02401**		
	Laboratory ID:	**RC092011**		
	Collection Date:	**9/12/96**		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		3 ug/L	None
	Acetone		3 ug/L	10U ug/L[1]

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SDG	**Parameter**	**Concentration**	**Qualifier**
WF030	**Client ID:** 66R01801 **Laboratory ID:** RC121010 **Collection Date:** 9/18/96 **Type:** Equipment rinsate		
	Volatiles		
	Acetone	4 ug/L	None
	Semivolatiles		
	Di-n-butylphthalate	3 ug/L	None
	Bis(2-ethylhexyl)phthalate	1 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None
WF030	**Client ID:** 66T02501 **Laboratory ID:** RC121001 **Collection Date:** 9/16/96 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	3 ug/L	None
	Acetone	3 ug/L	10U ug/L[1]
WF030	**Client ID:** 66T02601 **Laboratory ID:** RC121012 **Collection Date:** 9/19/96 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	3 ug/L	None
	Acetone	3 ug/L	None
WF031	**Client ID:** 05T02701 **Laboratory ID:** MB928001 **Collection Date:** 9/23/96 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	2 ug/L	None
WF031	**Client ID:** 33T02801 **Laboratory ID:** MB958001 **Collection Date:** 9/26/96 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	3 ug/L	None
WF031	**Client ID:** 05R01901 **Laboratory ID:** MB928011 **Collection Date:** 9/25/96 **Type:** Equipment rinsate		
	Volatiles	ND	None
	Semivolatiles		
	Di-n-butylphthalate	2 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None

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SDG	Parameter		Concentration	Qualifier
WF031B	**Client ID:**	16T04001		
	Laboratory ID:	MC447002		
	Collection Date:	11/21/96		
	Type:	Trip blank		
	Volatiles		ND	None
WF032	**Client ID:**	06T02901		
	Laboratory ID:	MC011001		
	Collection Date:	9/30/96		
	Type:	Trip blank		
	Volatiles		ND	None
WF032	**Client ID:**	29T03001		
	Laboratory ID:	MC037001		
	Collection Date:	10/3/96		
	Type:	Trip blank		
	Volatiles		ND	None
WF032	**Client ID:**	06R02001		
	Laboratory ID:	MC011006		
	Collection Date:	10/2/96		
	Type:	Equipment rinsate		
	Volatiles		ND	None
	Semivolatiles			
	Di-n-butylphthalate		3 ug/L	10U ug/L[1]
	Pesticides/PCBs		ND	None
WF033	**Client ID:**	29T03101		
	Laboratory ID:	MC085001		
	Collection Date:	10/7/96		
	Type:	Trip blank		
	Volatiles		ND	None
WF033	**Client ID:**	66T03201		
	Laboratory ID:	MC118001		
	Collection Date:	10/10/96		
	Type:	Trip blank		
	Volatiles			
	Acetone		26 ug/L	None
WF033	**Client ID:**	66R02101		
	Laboratory ID:	MC02101		
	Collection Date:	10/9/96		
	Type:	Equipment rinsate		
	Volatiles			
	Methylene chloride		1 ug/L	None
	Semivolatiles			
	Di-n-butylphthalate		6 ug/L	None
	Pesticides/PCBs		ND	None

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Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF034	**Client ID:**	**66T03301**		
	Laboratory ID:	**MC153001**		
	Collection Date:	**10/14/96**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF034	**Client ID:**	**66T03401**		
	Laboratory ID:	**MC176001**		
	Collection Date:	**10/17/96**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF034	**Client ID:**	**66R02201**		
	Laboratory ID:	**MC153007**		
	Collection Date:	**10/16/96**		
	Type:	**Equipment rinsate**		
	Volatiles			
	Toluene		8 ug/L	None
	Ethylbenzene		1 ug/L	None
	Xylenes (total)		2 ug/L	None
	Semivolatiles			
	Di-n-butylphthalate		2 ug/L	None
	Pesticides/PCBs		ND	None
WF035	**Client ID:**	**66T03501**		
	Laboratory ID:	**MC214001**		
	Collection Date:	**10/21/96**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF035	**Client ID:**	**66T03601**		
	Laboratory ID:	**MC231001**		
	Collection Date:	**10/24/96**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF035	**Client ID:**	**66R02301**		
	Laboratory ID:	**MC214006**		
	Collection Date:	**10/23/96**		
	Type:	**Equipment rinsate**		
	Volatiles		ND	None
	Semivolatiles			
	Di-n-butylphthalate		3 ug/L	None
	Pesticides/PCBs		ND	None
WF036	**Client ID:**	**66T03701**		
	Laboratory ID:	**MC262001**		
	Collection Date:	**10/28/96**		
	Type:	**Trip blank**		
	Volatiles		ND	None

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Organic Compounds			
SDG	**Parameter**	**Concentration**	**Qualifier**
WF036	**Client ID:** 31T03801 **Laboratory ID:** MC284001 **Collection Date:** 10/31/96 **Type:** Trip blank		
	Volatiles	ND	None
WF036	**Client ID:** 54R02401 **Laboratory ID:** MC262007 **Collection Date:** 10/30/96 **Type:** Equipment rinsate		
	Volatiles	ND	None
	Semivolatiles Di-n-butylphthalate	4 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	ND
WF037	**Client ID:** 15T03901 **Laboratory ID:** MC424001 **Collection Date:** 11/18/96 **Type:** Trip blank		
	Volatiles	ND	None
WF037	**Client ID:** 16T04001 **Laboratory ID:** MC448004 **Collection Date:** 11/21/96 **Type:** Trip blank		
	Volatiles	ND	None
WF037	**Client ID:** 15R02501 **Laboratory ID:** MC424009 **Collection Date:** 11/20/96 **Type:** Equipment rinsate		
	Volatiles	ND	None
WF037	**Client ID:** 15F00201 **Laboratory ID:** MC424010 **Collection Date:** 11/20/96 **Type:** Source blank		
	Volatiles Xylenes (total)	2 ug/L	None
	Semivolatiles Di-n-butylphthalate	4 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None
WF038	**Client ID:** 36RO2601 **Laboratory ID:** MC687016 **Collection Date:** 12/18/96 **Type:** Rinsate		
	Volatiles	ND	None

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SDG	Parameter		Concentration	Qualifier
WF038	**Client ID:**	36TO4101		
	Laboratory ID:	MC687001		
	Collection Date:	12/17/96		
	Type:	Trip Blank		
	Volatiles		ND	None
WF039	**Client ID:**	35TO4201		
	Laboratory ID:	MC698001		
	Collection Date:	12/19/97		
	Type:	Trip Blank		
	Volatiles		ND	None
WF039	**Client ID:**	35RO2701		
	Laboratory ID:	MC698011		
	Collection Date:	12/21/96		
	Type:	Equipment rinsate		
	Volatiles		ND	None
WF040	**Client ID:**	35TO4301		
	Laboratory ID:	MC783001		
	Collection Date:	1/7/97		
	Type:	Trip blank		
	Volatiles			
	Bromomethane		1 ug/L	10U ug/L[1]
WF040	**Client ID:**	37RO2801		
	Laboratory ID:	MC783017		
	Collection Date:	1/9/97		
	Type:	Equipment rinsate		
	Volatiles			
	Acetone		5 ug/L	10U ug/L[1]
	Carbon disulfide		2 ug/L	None
WF041	**Client ID:**	35T04501		
	Laboratory ID:	MD908001		
	Collection Date:	6/11/97		
	Type:	Trip blank		
	Volatiles			
	Acetone		6 ug/L	None
WF041	**Client ID:**	37T04601		
	Laboratory ID:	MD926001		
	Collection Date:	6/12/97		
	Type:	Trip blank		
	Volatiles			
	Methylene chloride		1 ug/L	None
WF041	**Client ID:**	35T04701		
	Laboratory ID:	MD950001		
	Collection Date:	6/15/97		
	Type:	Trip blank		
	Volatiles			
	Methylene chloride		3 ug/L	None
	Xylene (total)		1 ug/L	None

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SDG	Parameter		Concentration	Qualifier
WF041	**Client ID:**	13T04801		
	Laboratory ID:	MD985001		
	Collection Date:	6/16/97		
	Type:	Trip blank		
	Volatiles			
	Methylene chloride		2 ug/L	None
	Acetone		6 ug/L	None
WF041	**Client ID:**	35F00301		
	Laboratory ID:	MD908002		
	Collection Date:	6/11/97		
	Type:	Source blank		
	Semivolatiles			
	Di-n-butylphthalate		3 ug/L	None
	Pesticides & PCBs		**ND**	-
WF041	**Client ID:**	35R03001		
	Laboratory ID:	MD908003		
	Collection Date:	6/11/97		
	Type:	Equipment rinsate		
	Semivolatiles			
	Di-n-butylphthalate		4 ug/L	None
	Bis(2-ethylhexyl)phthalate		8 ug/L	None
	Pesticides & PCBs		ND	None
WF042	**Client ID:**	05T04901		
	Laboratory ID:	ME007001		
	Collection Date:	6/18/97		
	Type:	Trip blank		
	Volatiles		ND	None
WF042	**Client ID:**	05T05001		
	Laboratory ID:	ME021001		
	Collection Date:	6/20/97		
	Type:	Trip blank		
	Volatiles			
	Acetone		2 ug/L	None
WF042	**Client ID:**	05R03101		
	Laboratory ID:	ME007006		
	Collection Date:	6/17/97		
	Type:	Equipment rinsate		
	Volatiles		ND	None
WF043	**Client ID:**	05R03201		
	Laboratory ID:	ME042002		
	Collection Date:	6/23/97		
	Type:	Equipment rinsate		
	Volatiles			
	1,2-Dichloropropane		1 ug/L	None

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SDG	Parameter		Concentration	Qualifier
WF043	**Client ID:**	05T05101		
	Laboratory ID:	MW042001		
	Collection Date:	6/23/97		
	Type:	Trip blank		
	Volatiles		ND	None
WF043	**Client ID:**	33T05201		
	Laboratory ID:	MW053001		
	Collection Date:	6/24/97		
	Type:	Trip blank		
	Volatiles			
	Acetone		3 ug/L	None
WF043	**Client ID:**	33T05301		
	Laboratory ID:	ME073001		
	Collection Date:	6/25/97		
	Type:	Trip blank		
	Volatiles		ND	None
WF043	**Client ID:**	30T05401		
	Laboratory ID:	ME087001		
	Collection Date:	6/26/97		
	Type:	Trip blank		
	Volatiles			
	Acetone		4 ug/L	None
WF044	**Client ID:**	06R03301		
	Laboratory ID:	ME100002		
	Collection Date:	6/29/97		
	Type:	Equipment rinsate		
	Volatiles			
	Acetone		7 ug/L	None
	Trichloroethene		6 ug/L	None
	Toluene		3 ug/L	None
	Ethylbenzene		1 ug/L	None
	Xylene (total)		2 ug/L	None
WF044	**Client ID:**	06T05501		
	Laboratory ID:	ME100001		
	Collection Date:	6/29/97		
	Type:	Trip blank		
	Volatiles		ND	None
WF044	**Client ID:**	66T05601		
	Laboratory ID:	ME110001		
	Collection Date:	6/30/97		
	Type:	Trip blank		
	Volatiles			
	Acetone		5 ug/L	10U ug/L[1]
WF044	**Client ID:**	66T05701		
	Laboratory ID:	ME133001		
	Collection Date:	7/2/97		
	Type:	Trip blank		
	Volatiles		ND	None

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SDG	Parameter		Concentration	Qualifier
WF044	**Client ID:**	**66T05801**		
	Laboratory ID:	**ME135001**		
	Collection Date:	**7/2/97**		
	Type:	**Trip blank**		
	Volatiles			
	Acetone		3 ug/L	10U ug/L[1]
WF045	**Client ID:**	**OWR03401**		
	Laboratory ID:	**ME149002**		
	Collection Date:	**7/7/97**		
	Type:	**Equipment rinsate**		
	Volatiles			
	Acetone		3 ug/L	10U ug/L[1]
	1,2-Dichloropropane		1 ug/L	None
	Semivolatiles			
	Di-n-butylphthalate		5 ug/L	10U ug/L[1]
	Pesticides & PCBs		ND	None
WF045	**Client ID:**	**OWT05901**		
	Laboratory ID:	**ME149001**		
	Collection Date:	**7/7/97**		
	Type:	**Trip blank**		
	Volatiles			
	Acetone		2 ug/L	10U ug/L[1]
WF045	**Client ID:**	**OWT06001**		
	Laboratory ID:	**ME159001**		
	Collection Date:	**7/8/97**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF045	**Client ID:**	**66T06101**		
	Laboratory ID:	**ME175001**		
	Collection Date:	**7/9/97**		
	Type:	**Trip blank**		
	Volatiles			
	Acetone		2 ug/L	10U ug/L[1]
WF045	**Client ID:**	**OWT06201**		
	Laboratory ID:	**ME190001**		
	Collection Date:	**7/10/97**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF045	**Client ID:**	**OWT06401**		
	Laboratory ID:	**ME226001**		
	Collection Date:	**7/14/97**		
	Type:	**Trip blank**		
	Volatiles			
	Acetone		250 ug/L	None

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SDG	Parameter		Concentration	Qualifier
WF045	**Client ID:**	**OWT06401DL**		
	Laboratory ID:	**ME226001DL**		
	Collection Date:	7/14/97		
	Type:	**Trip blank**		
	Volatiles			
	Acetone		250 ug/L	None
WF046	**Client ID:**	31R03301		
	Laboratory ID:	MW241002		
	Collection Date:	7/15/97		
	Type:	**Equipment rinsate**		
	Volatiles			
	1,2-Dichloropropane		1 ug/L	None
	Semivolatiles			
	Di-n-butylphthalate		12 ug/L	12U ug/L[1]
	Pesticides & PCBs		ND	None
WF046	**Client ID:**	31T06501		
	Laboratory ID:	ME241001		
	Collection Date:	7/15/97		
	Type:	**Trip blank**		
	Volatiles			
	Acetone		4 ug/L	None
WF046	**Client ID:**	31T06601		
	Laboratory ID:	ME261001		
	Collection Date:	7/16/97		
	Type:	**Trip blank**		
	Volatiles			
	Toluene		1 ug/L	None
WF046	**Client ID:**	31T06701		
	Laboratory ID:	ME305001		
	Collection Date:	7/21/97		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		1 ug/L	None
WF047	**Client ID:**	**STOR_BLK**		
	Laboratory ID:	**ME243008**		
	Collection Date:	7/15/97		
	Type:	**Storage blank**		
	Volatiles		ND	None
WF047	**Client ID:**	**STOR_BLK2**		
	Laboratory ID:	**ME267008**		
	Collection Date:	7/16/97		
	Type:	**Storage blank**		
	Volatiles			
	Acetone		4 ug/L	None
	Toluene		0.4 ug/L	None

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SDG	Parameter		Concentration	Qualifier
WF047	**Client ID:**	**39T10001**		
	Laboratory ID:	**ME244001**		
	Collection Date:	**7/15/97**		
	Type:	**Trip blank**		
	Volatiles			
	Carbon disulfide		0.40 ug/L	None
	Toluene		0.50 ug/L	None
WF048	**Client ID:**	**39R03401**		
	Laboratory ID:	**ME264009**		
	Collection Date:	**7/17/97**		
	Type:	**Equipment rinsate**		
	Volatiles			
	1,2-Dichloropropane		1 ug/L	None
WF049	**Client ID:**	**39T10201**		
	Laboratory ID:	**ME262001**		
	Collection Date:	**7/15/97**		
	Type:	**Trip blank**		
	Volatiles			
	Toluene		0.90 ug/L	None
WF049	**Client ID:**	**39T10401**		
	Laboratory ID:	**ME263007**		
	Collection Date:	**7/17/97**		
	Type:	**Trip blank**		
	Volatiles			
	Toluene		0.40 ug/L	None
WF051	**Client ID:**	**16R03501**		
	Laboratory ID:	**ME306002**		
	Collection Date:	**7/21/97**		
	Type:	**Equipment rinsate**		
	Volatiles			
	Methylene chloride		1 ug/L	None
WF051	**Client ID:**	**16T06801**		
	Laboratory ID:	**ME306001**		
	Collection Date:	**7/21/97**		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		1 ug/L	None
	Acetone		3 ug/L	None
WF051	**Client ID:**	**16T06901**		
	Laboratory ID:	**ME322001**		
	Collection Date:	**7/22/97**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF051	**Client ID:**	**16T07001**		
	Laboratory ID:	**ME340001**		
	Collection Date:	**7/23/97**		
	Type:	**Trip blank**		
	Volatiles		ND	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF051	**Client ID:**	**16T07101**		
	Laboratory ID:	**ME348001**		
	Collection Date:	**7/25/97**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF052	**Client ID:**	**STORAGEBLK**		
	Laboratory ID:	**ME346008**		
	Collection Date:	**7/25/97**		
	Type:	**Storage blank**		
	Volatiles			
	Methylene chloride		1 ug/L	None
	Acetone		3 ug/L	None
WF052	**Client ID:**	**39T10501**		
	Laboratory ID:	**ME346007**		
	Collection Date:	**7/25/97**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF053	**Client ID:**	**15R03701**		
	Laboratory ID:	**ME367002**		
	Collection Date:	**7/27/97**		
	Type:	**Equipment rinsate**		
	Volatiles		ND	None
WF053	**Client ID:**	**15T07201**		
	Laboratory ID:	**ME367001**		
	Collection Date:	**7/27/97**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF053	**Client ID:**	**15T07301**		
	Laboratory ID:	**ME377001**		
	Collection Date:	**7/28/97**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF053	**Client ID:**	**15T07401**		
	Laboratory ID:	**ME390001**		
	Collection Date:	**7/29/97**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF053	**Client ID:**	**15T07501**		
	Laboratory ID:	**ME404001**		
	Collection Date:	**7/30/97**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF054	**Client ID:**	**15R03801**		
	Laboratory ID:	**ME441005**		
	Collection Date:	**8/5/97**		
	Type:	**Equipment rinsate**		
	Volatiles		ND	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	**Parameter**	**Concentration**	**Qualifier**
WF054	**Client ID:** 30R03901 **Laboratory ID:** ME450002 **Collection Date:** 8/6/97 **Type:** Equipment rinsate Volatiles 1,2-Dichloropropane	 1 ug/L	 None
WF054	**Client ID:** 15T07601 **Laboratory ID:** ME441001 **Collection Date:** 8/4/97 **Type:** Trip blank Volatiles	ND	None
WF054	**Client ID:** 30T07701 **Laboratory ID:** ME450001 **Collection Date:** 8/5/97 **Type:** Trip blank Volatiles	ND	None
WF055	**Client ID:** OWR04101 **Laboratory ID:** MF004002 **Collection Date:** 10/27/97 **Type:** Equipment rinsate Volatiles	ND	None
WF055	**Client ID:** 13R04201 **Laboratory ID:** MF004005 **Collection Date:** 10/28/97 **Type:** Equipment rinsate Volatiles	ND	None
WF055	**Client ID:** OWT08001 **Laboratory ID:** MF004001 **Collection Date:** 10/27/97 **Type:** Trip blank Volatiles	ND	None

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

Table X
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Client ID	Analyte	Criteria		% Recovery		RPD/Difference	Qualifier
			% Recovery	Difference	MS	MSD		
WF022	BKG00101	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF023	02G00301	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF024	15G00701	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF025	15G00601	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF026	15G00803	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF027	16G00501	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF028	12G00101	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF029	14G00101	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF030	66G00601	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF031	05G01001	Iron	-	±100	-	-	124.8 ug/L	J
		Lead	-	±3.0	-	-	9.2 ug/L	J
		Sodium	-	±5000	-	-	5978 ug/L	J
		Zinc	-	±20.0	-	-	174 ug/L	J
		Cyanide	75-125	-	3.7	-	-	J (det) R (ND)
WF031B	None	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF032	29G00501	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF033	66G00201	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None

Table X
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Client ID	Analyte	Criteria: % Recovery	Criteria: Difference	% Recovery: MS	% Recovery: MSD	RPD/Difference	Qualifier
WF034	30G00301	Antimony	75-125	-	126.7	-	-	J (all detects)
		Cyanide	-	-	-	-	-	None
WF035	66G01701	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF036	54G00101	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF037	15F00201	Metals	-	-	-	-	-	None
		Cyanide	75-125	-	3.7	-	-	J (det) R (ND)
WF041	35G00101	Aluminum	-	≤100	-	-	402 ug/L	J
		Iron	-	≤100	-	-	309 ug/L	J
		Manganese	-	≤10	-	-	75.2 ug/L	J
		Cyanide	-	-	-	-	-	None
WF045	OWG00502	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF046	31G00101	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF047	39W034	Metals	-	-	-	-	-	None
WF051	None	Metals	-	-	-	-	-	None
WF053	15G00602	Metals	-	-	-	-	-	None
WF054	15G00801	Metals	-	-	-	-	-	None

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF022	**Client ID**	**BKG00101**	**BKG00101D**	
	Laboratory ID	**RB858003**	**RB858004**	
	Collection Date	**7/16/96**	**7/16/96**	
	Aluminum	43.4 ug/L	54.4 ug/L	22
	Barium	15.6 ug/L	15.6 ug/L	0
	Calcium	536 ug/L	558 ug/L	4
	Iron	54.0 ug/L	57.9 ug/L	7
	Lead	ND	0.80 ug/L	Not calculable
	Magnesium	499 ug/L	521 ug/L	4
	Manganese	1.7 ug/L	1.9 ug/L	11
	Selenium	0.67 ug/L	ND	Not calculable
	Sodium	1080 ug/L	1080 ug/L	0
	Zinc	2.4 ug/L	ND	Not calculable
	Cyanide	3.8 ug/L	6.5 ug/L	52
WF022	**Client ID**	**01G00102**	**01G00102D**	
	Laboratory ID	**RB873008**	**RB873009**	
	Collection Date	**7/19/96**	**7/19/96**	
	Aluminum	19.1 ug/L	10.3 ug/L	50
	Barium	15.6 ug/L	15.6 ug/L	0
	Beryllium	0.53 ug/L	ND	Not calculable
	Calcium	5850 ug/L	6250 ug/L	7
	Copper	ND	1.4 ug/L	Not calculable
	Iron	12.2 ug/L	8.8 ug/L	32
	Lead	1.3 ug/L	1.5 ug/L	14
	Magnesium	337 ug/L	331 ug/L	2
	Manganese	6.7 ug/L	9.0 ug/L	29
	Potassium	938 ug/L	842 ug/L	11
	Sodium	2100 ug/L	2070 ug/L	1
	Vanadium	ND	1.6 ug/L	Not calculable
	Zinc	10.2 ug/L	11.4 ug/L	11
	Cyanide	1.9 ug/L	ND	Not calculable
WF023	**Client ID**	**02G00301**	**02G00301D**	
	Laboratory ID	**RB887012**	**RB887013**	
	Collection Date	**7/24/96**	**7/24/96**	
	Aluminum	79.3 ug/L	84.6 ug/L	6
	Barium	128 ug/L	129 ug/L	0.8
	Beryllium	0.39 ug/L	ND	Not calculable
	Calcium	113000 ug/L	113000 ug/L	0
	Iron	36.2 ug/L	38.7 ug/L	7
	Lead	1.4 ug/L	1.3 ug/L	7
	Magnesium	9560 ug/L	9590 ug/L	0.3
	Manganese	13.5 ug/L	13.7 ug/L	1
	Nickel	7.8 ug/L	9.6 ug/L	21
	Potassium	4610 ug/L	4580 ug/L	0.7
	Selenium	1.2 ug/L	0.66 ug/L	58
	Sodium	2200 ug/L	2240 ug/L	2
	Vanadium	3.0 ug/L	2.8 ug/L	7
	Zinc	1.8 ug/L	2.0 ug/L	11
	Cyanide	4.5 ug/L	2.0 ug/L	77

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF024	**Client ID**	**15G00701**	**15G00701D**	
	Laboratory ID	**RB920009**	**RB950010**	
	Collection Date	**7/31/96**	**7/31/96**	
	Aluminum	161 ug/L	173 ug/L	7
	Barium	15.6 ug/L	19.3 ug/L	21
	Calcium	356 ug/L	360 ug/L	1
	Chromium	2.9 ug/L	2.0 ug/L	37
	Iron	183 ug/L	202 ug/L	10
	Lead	0.70 ug/L	0.60 ug/L	15
	Magnesium	433 ug/L	422 ug/L	3
	Manganese	2.8 ug/L	2.6 ug/L	7
	Sodium	1530 ug/L	1610 ug/L	5
	Vanadium	ND	1.2 ug/L	Not calculable
	Zinc	3.4 ug/L	3.6 ug/L	6
	Cyanide	2.6 ug/L	3.2 ug/L	21
WF025	**Client ID**	**15G00601**	**15G00601D**	
	Laboratory ID	**RB956006**	**RB956008**	
	Collection Date	**8/7/96**	**8/7/96**	
	Aluminum	89.4 ug/L	55.8 ug/L	46
	Arsenic	8.0 ug/L	7.8 ug/L	2
	Barium	67.6 ug/L	63.7 ug/L	6
	Calcium	3690 ug/L	3620 ug/L	2
	Iron	31000 ug/L	30500 ug/L	2
	Lead	0.90 ug/L	0.50U ug/L	Not calculable
	Magnesium	1940 ug/L	1900 ug/L	2
	Manganese	139 ug/L	136 ug/L	2
	Potassium	2460 ug/L	2340 ug/L	5
	Sodium	2630 ug/L	2590 ug/L	2
	Zinc	3.4 ug/L	3.3 ug/L	3
	Cyanide	1.5U ug/L	8.1 ug/L	Not calculable
WF026	**Client ID**	**15G00803**	**15G00803D**	
	Laboratory ID	**RB980007**	**RB980008**	
	Collection Date	**8/14/96**	**8/14/96**	
	Aluminum	187 ug/L	146 ug/L	25
	Barium	10.6 ug/L	10.8 ug/L	2
	Calcium	1440 ug/L	1170 ug/L	21
	Chromium	2.9 ug/L	2.0U ug/L	Not calculable
	Cobalt	2.3U ug/L	2.4 ug/L	Not calculable
	Copper	4.0 ug/L	2.4 ug/L	50
	Iron	194 ug/L	175 ug/L	10
	Lead	0.80 ug/L	0.50 ug/L	46
	Magnesium	322 ug/L	296 ug/L	8
	Manganese	33.1 ug/L	32.9 ug/L	0.6
	Potassium	522 ug/L	316U ug/L	Not calculable
	Sodium	5350 ug/L	5380 ug/L	0.6
	Vanadium	2.0 ug/L	1.5 ug/L	29
	Zinc	176 ug/L	178 ug/L	1
	Cyanide	1.6 ug/L	4.2 ug/L	90

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF026	**Client ID**	**16G00403**	**16G00403D**	
	Laboratory ID	**RB980020**	**RB980021**	
	Collection Date	**8/16/96**	**8/16/96**	
	Aluminum	278 ug/L	290 ug/L	4
	Arsenic	1.0 ug/L	0.50U ug/L	Not calculable
	Barium	28.6 ug/L	27.5 ug/L	4
	Calcium	3110 ug/L	3300 ug/L	6
	Chromium	2.3 ug/L	2.9 ug/L	23
	Copper	1.1U ug/L	1.3 ug/L	Not calculable
	Iron	1370 ug/L	879 ug/L	44
	Lead	4.0 ug/L	2.7 ug/L	39
	Magnesium	1320 ug/L	987 ug/L	29
	Manganese	41.3 ug/L	33.5 ug/L	21
	Potassium	540 ug/L	713 ug/L	28
	Sodium	2570 ug/L	2590 ug/L	0.8
	Vanadium	2.2 ug/L	1.2U ug/L	Not calculable
	Zinc	103 ug/L	945 ug/L	161
	Cyanide	2.9 ug/L	1.6 ug/L	58
WF027	**Client ID**	**16G00501**	**16G00501D**	
	Laboratory ID	**RC016009**	**RC016013**	
	Collection Date	**8/21/96**	**8/21/96**	
	Aluminum	12.6 ug/L	16.7 ug/L	28
	Barium	10 ug/L	10 ug/L	0
	Calcium	239 ug/L	234 ug/L	2
	Cobalt	3.2 ug/L	2.3U ug/L	Not calculable
	Iron	9.2 ug/L	5.3 ug/L	54
	Magnesium	276 ug/L	261 ug/L	6
	Manganese	1.0U ug/L	2.1 ug/L	Not calculable
	Sodium	1550 ug/L	1450 ug/L	7
	Zinc	2.6 ug/L	1.6 ug/L	48
WF027	**Client ID**	**09G00301**	**09G00301D**	
	Laboratory ID	**RC016019**	**RC016020**	
	Collection Date	**8/23/96**	**8/23/96**	
	Aluminum	407 ug/L	372 ug/L	9
	Antimony	8.6U ug/L	9.3 ug/L	Not calculable
	Arsenic	2.6 ug/L	2.8 ug/L	7
	Barium	27.1 ug/L	25.8 ug/L	5
	Calcium	15300 ug/L	14600 ug/L	5
	Chromium	4.0 ug/L	2.4 ug/L	50
	Iron	173 ug/L	148 ug/L	16
	Lead	0.50U ug/L	0.60 ug/L	Not calculable
	Magnesium	158 ug/L	160 ug/L	1
	Manganese	1.5 ug/L	1.7 ug/L	12
	Potassium	2390 ug/L	2010 ug/L	17
	Sodium	2070 ug/L	1950 ug/L	6
	Vanadium	16.4 ug/L	14.3 ug/L	14
	Zinc	14.8 ug/L	1.2 ug/L	170

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF028	**Client ID**	**12G00101**	**12G00101D**	
	Laboratory ID	**RC044012**	**RC044017**	
	Collection Date	**8/27/96**	**8/27/96**	
	Aluminum	14.0 ug/L	15.1 ug/L	8
	Barium	14.5 ug/L	14.5 ug/L	0
	Calcium	1840 ug/L	1870 ug/L	2
	Lead	0.60 ug/L	0.50U ug/L	Not calculable
	Magnesium	320 ug/L	327 ug/L	2
	Manganese	1.0U ug/L	1.4 ug/L	Not calculable
	Potassium	2220 ug/L	2290 ug/L	3
	Sodium	2310 ug/L	2360 ug/L	2
	Thallium	0.70 ug/L	0.60U ug/L	Not calculable
	Zinc	6.7 ug/L	5.5 ug/L	20
	Cyanide	1.8U ug/L	2.1 ug/L	Not calculable
WF028	**Client ID**	**11G00201**	**11G00201D**	
	Laboratory ID	**RC044011**	**RC044018**	
	Collection Date	**8/28/96**	**8/28/96**	
	Aluminum	2770 ug/L	2320 ug/L	18
	Arsenic	1.7 ug/L	2.0 ug/L	16
	Barium	50.3 ug/L	51.6 ug/L	3
	Beryllium	0.40 ug/L	0.30U ug/L	Not calculable
	Calcium	35400 ug/L	41800 ug/L	17
	Chromium	20.4 ug/L	19.2 ug/L	6
	Copper	2.0 ug/L	3.1 ug/L	43
	Iron	232 ug/L	337 ug/L	37
	Lead	0.50U ug/L	0.90 ug/L	Not calculable
	Magnesium	388 ug/L	538 ug/L	32
	Manganese	2.2 ug/L	4.8 ug/L	74
	Potassium	12900 ug/L	9610 ug/L	29
	Sodium	3420 ug/L	2950 ug/L	15
	Vanadium	11.0 ug/L	11.0 ug/L	0
	Zinc	3.4 ug/L	24.3 ug/L	151
	Cyanide	1.5U ug/L	3.3 ug/L	Not calculable
WF029	**Client ID**	**14G00101**	**14G00101D**	
	Laboratory ID	**RC092007**	**RC092009**	
	Collection Date	**9/11/96**	**9/11/96**	
	Aluminum	33.1 ug/L	26.5 ug/L	22
	Arsenic	0.50 ug/L	0.50U ug/L	Not calculable
	Barium	22.3 ug/L	22.3 ug/L	0
	Calcium	3060 ug/L	2870 ug/L	6
	Iron	22.0 ug/L	27.3 ug/L	22
	Lead	1.3 ug/L	0.80 ug/L	48
	Magnesium	702 ug/L	691 ug/L	2
	Manganese	1.9 ug/L	1.9 ug/L	0
	Mercury	0.12 ug/L	0.10U ug/L	Not calculable
	Sodium	1590 ug/L	1570 ug/L	1
	Vanadium	1.2U ug/L	1.4 ug/L	Not calculable
	Zinc	89.5 ug/L	96.8 ug/L	8

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF030	**Client ID**	**66G00601**	**66G00601D**	
	Laboratory ID	**RC121007**	**RC121011**	
	Collection Date	**9/18/96**	**9/18/96**	
	Aluminum	39.9 ug/L	39.7 ug/L	**0.5**
	Barium	38.1 ug/L	36.2 ug/L	**5**
	Calcium	863 ug/L	770 ug/L	**11**
	Copper	1.8 ug/L	1.1U ug/L	**Not calculable**
	Iron	8.2 ug/L	41.9 ug/L	**134**
	Lead	0.90 ug/L	0.50U ug/L	**Not calculable**
	Magnesium	1130 ug/L	1110 ug/L	**2**
	Manganese	5.0 ug/L	4.6 ug/L	**8**
	Potassium	860 ug/L	689 ug/L	**22**
	Selenium	0.64 ug/L	0.60U ug/L	**Not calculable**
	Sodium	1280 ug/L	1160 ug/L	**10**
	Zinc	2.9 ug/L	4.8 ug/L	**49**
WF030	**Client ID**	**66G02203**	**66G02203D**	
	Laboratory ID	**RC121016**	**RC121017**	
	Collection Date	**9/20/96**	**9/20/96**	
	Aluminum	44.0 ug/L	51.9 ug/L	16
	Barium	6.4 ug/L	6.4 ug/L	0
	Calcium	751 ug/L	731 ug/L	3
	Cobalt	2.3U ug/L	2.4 ug/L	Not calculable
	Iron	35.6 ug/L	38.9 ug/L	9
	Magnesium	271 ug/L	242 ug/L	11
	Manganese	9.7 ug/L	9.7 ug/L	0
	Potassium	491 ug/L	316U ug/L	Not calculable
	Sodium	2810 ug/L	2760 ug/L	2
	Zinc	1.2 ug/L	2.2 ug/L	59
	Cyanide	1.8U ug/L	12.0 ug/L	Not calculable
WF031	**Client ID**	**05G01001**	**05G01001D**	
	Laboratory ID	**MB928007**	**MB928012**	
	Collection Date	**9/25/96**	**9/25/96**	
	Barium	27.6 ug/L	27.1 ug/L	2
	Calcium	854 ug/L	803 ug/L	6
	Chromium	0.61 ug/L	0.36 ug/L	52
	Cobalt	0.85 ug/L	0.72 ug/L	17
	Copper	35.6 ug/L	1.7U ug/L	Not calculable
	Iron	40.1 ug/L	31.8U ug/L	Not calculable
	Lead	4.4 ug/L	1.8U ug/L	Not calculable
	Magnesium	874 ug/L	871 ug/L	0.6
	Manganese	3.3 ug/L	2.5 ug/L	28
	Mercury	0.03 ug/L	0.04 ug/L	29
	Nickel	1.4 ug/L	1.4 ug/L	0
	Potassium	3.1U ug/L	825 ug/L	Not calculable
	Selenium	5.4 ug/L	3.9U ug/L	Not calculable
	Sodium	15100 ug/L	14900 ug/L	1
	Thallium	7.4 ug/L	1.9U ug/L	Not calculable
	Vanadium	0.58U ug/L	0.63 ug/L	Not calculable
	Zinc	13.7 ug/L	3.8 ug/L	113

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF031	**Client ID**	**33G00301**	**33G00301D**	
	Laboratory ID	**MB958006**	**MB958007**	
	Collection Date	**9/27/96**	**9/27/96**	
	Aluminum	156	98.7	45
	Antimony	3.5	3.4U	Not calculable
	Barium	59.3	59.9	1
	Calcium	2230	2230	0
	Chromium	0.88	0.34U	Not calculable
	Cobalt	0.70	0.49	35
	Iron	107	50.6	72
	Magnesium	1750	1760	0.6
	Manganese	21.2	21.5	1
	Potassium	31.8	1040	188
	Sodium	5370	5550	3
	Thallium	2.9	3.4	16
	Vanadium	1.0	0.58U	Not calculable
	Zinc	7.4	7.2	3
WF032	**Client ID**	**29G00501**	**29G00501D**	
	Laboratory ID	**MC011007**	**MC011008**	
	Collection Date	**10/2/96**	**10/2/96**	
	Barium	89.7 ug/L	84.2 ug/L	6
	Beryllium	0.14 ug/L	0.19 ug/L	30
	Calcium	1580 ug/L	1470 ug/L	7
	Chromium	2.1 ug/L	2.8 ug/L	29
	Cobalt	0.94 ug/L	0.98 ug/L	4
	Copper	2.7 ug/L	4.4 ug/L	48
	Magnesium	2500 ug/L	2320 ug/L	7
	Manganese	8.4 ug/L	8.0 ug/L	5
	Mercury	0.04 ug/L	0.04 ug/L	0
	Sodium	5040 ug/L	5030 ug/L	0.2
	Zinc	5.1 ug/L	3.8 ug/L	29
	Cyanide	1.0 ug/L	1.2 ug/L	18
WF033	**Client ID**	**66G00201**	**66G00201D**	
	Laboratory ID	**MC118002**	**MC118003**	
	Collection Date	**10/9/96**	**10/9/96**	
	Barium	20.8 ug/L	20.7 ug/L	0.5
	Calcium	3250 ug/L	3100 ug/L	5
	Chromium	0.75 ug/L	0.44 ug/L	52
	Copper	1.7U ug/L	2.7 ug/L	Not calculable
	Iron	73.8 ug/L	31.8U ug/L	Not calculable
	Magnesium	456 ug/L	457 ug/L	0.2
	Manganese	3.4 ug/L	3.2 ug/L	6
	Mercury	0.03 ug/L	0.03 ug/L	0
	Potassium	648 ug/L	1920 ug/L	99
	Sodium	3040 ug/L	3020 ug/L	0.7
	Zinc	3.6 ug/L	6.0 ug/L	50

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF034	**Client ID**	**30G00301**	**30G00301D**	
	Laboratory ID	**MC153005**	**MC153008**	
	Collection Date	**10/16/96**	**10/16/96**	
	Barium	28.0 ug/L	27.8 ug/L	0.7
	Beryllium	0.20 ug/L	0.13U ug/L	Not calculable
	Calcium	1530 ug/L	1480 ug/L	3
	Copper	11.0 ug/L	3.2 ug/L	110
	Iron	626 ug/L	634 ug/L	1
	Lead	3.8 ug/L	2.4 ug/L	45
	Magnesium	642 ug/L	650 ug/L	1
	Manganese	20.7 ug/L	21.0 ug/L	1
	Mercury	0.04 ug/L	0.05 ug/L	22
	Potassium	1880 ug/L	2680 ug/L	35
	Sodium	4600 ug/L	4490 ug/L	2
	Zinc	5.5 ug/L	4.4 ug/L	22
WF035	**Client ID**	**66G01701**	**66G01701D**	
	Laboratory ID	**MC214005**	**MC214007**	
	Collection Date	**10/23/96**	**10/23/96**	
	Aluminum	24.3 ug/L	30.9 ug/L	24
	Barium	10.2 ug/L	10.7 ug/L	5
	Calcium	766 ug/L	816 ug/L	6
	Copper	1.7U ug/L	22.5 ug/L	Not calculable
	Iron	343 ug/L	348 ug/L	1
	Lead	2.0U ug/L	2.6 ug/L	Not calculable
	Magnesium	320 ug/L	324 ug/L	1
	Manganese	4.2 ug/L	5.4 ug/L	25
	Mercury	0.03 ug/L	0.03 ug/L	0
	Selenium	4.0 ug/L	3.9U ug/L	Not calculable
	Sodium	7660 ug/L	7790 ug/L	2
	Zinc	2.5 ug/L	26.3 ug/L	165
WF036	**Client ID**	**54G00101**	**54G00101D**	
	Laboratory ID	**MC262004**	**MC262008**	
	Collection Date	**10/30/96**	**10/30/96**	
	Aluminum	87.6 ug/L	91.6 ug/L	4
	Barium	75.2 ug/L	74.3 ug/L	1
	Beryllium	0.18 ug/L	0.18 ug/L	0
	Calcium	1680 ug/L	1660 ug/L	1
	Chromium	1.2 ug/L	1.0 ug/L	2
	Cobalt	0.90 ug/L	1.4 ug/L	43
	Magnesium	1950 ug/L	1920 ug/L	2
	Manganese	13.9 ug/L	12.9 ug/L	7
	Mercury	0.02 ug/L	0.01U ug/L	Not calculable
	Potassium	2410 ug/L	2530 ug/L	5
	Sodium	2110 ug/L	2070 ug/L	2
	Zinc	4.5 ug/L	3.5 ug/L	25

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF041	**Client ID**	**35G00101**	**35G00101D**	
	Laboratory ID	**MD908004**	**MD908005**	
	Collection Date	**6/11/97**	**6/11/97**	
	Aluminum	47.8 ug/L	45.2 ug/L	6
	Barium	78.8 ug/L	79.0 ug/L	0.2
	Calcium	3150 ug/L	3240 ug/L	3
	Copper	8.2 ug/L	6.8 ug/L	19
	Iron	15.9 ug/L	19.0 ug/L	18
	Lead	1.7 ug/L	0.93U ug/L	Not calculable
	Magnesium	2340 ug/L	2370 ug/L	1
	Manganese	28.7 ug/L	28.9 ug/L	0.7
	Sodium	4330 ug/L	4430 ug/L	2
	Thallium	1.9 ug/L	0.89U ug/L	Not calculable
	Zinc	12.1 ug/L	130 ug/L	166
	Cyanide	ND	ND	-
WF041	**Client ID**	**35G00202**	**35G00202D**	
	Laboratory ID	**MD950002**	**MD950003**	
	Collection Date	**6/15/97**	**6/15/97**	
	Aluminum	65.0 ug/L	50.7 ug/L	25
	Barium	24.8 ug/L	25.3 ug/L	2
	Calcium	973 ug/L	1030 ug/L	6
	Copper	5.6 ug/L	3.5 ug/L	46
	Iron	180 ug/L	196 ug/L	8
	Lead	0.93U ug/L	1.9 ug/L	Not calculable
	Magnesium	813 ug/L	819 ug/L	0.7
	Manganese	9.5 ug/L	9.3 ug/L	2
	Selenium	1.8U ug/L	2.6 ug/L	Not calculable
	Sodium	20900 ug/L	21700 ug/L	4
	Thallium	1.0 ug/L	0.89U ug/L	Not calculable
	Zinc	18.7 ug/L	15.4 ug/L	19
	Cyanide	ND	ND	-
WF045	**Client ID**	**OWG00502**	**OWG00502D**	
	Laboratory ID	**ME149004**	**ME149005**	
	Collection Date	**7/8/97**	**7/8/97**	
	Aluminum	175 ug/L	160 ug/L	9
	Barium	7.3 ug/L	7.1 ug/L	3
	Calcium	648 ug/L	585 ug/L	10
	Copper	2.9 ug/L	4.4 ug/L	41
	Iron	106 ug/L	97.1 ug/L	9
	Magnesium	308 ug/L	317 ug/L	3
	Manganese	3.3 ug/L	3.5 ug/L	6
	Nickel	7.8 ug/L	7.7U ug/L	Not calculable
	Sodium	1990 ug/L	2060 ug/L	3
	Zinc	4.5 ug/L	4.7 ug/L	4
	Cyanide	ND	ND	-

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF045	**Client ID**	**OWG00302**	**OWG00302D**	
	Laboratory ID	**ME190002**	**ME190003**	
	Collection Date	**7/10/97**	**7/10/97**	
	Aluminum	31.5 ug/L	16.6U ug/L	Not calculable
	Barium	10.2 ug/L	10.5 ug/L	3
	Calcium	460 ug/L	454 ug/L	1
	Iron	83.3 ug/L	51.1 ug/L	48
	Lead	1.9 ug/L	1.2U ug/L	Not calculable
	Magnesium	286 ug/L	300 ug/L	5
	Manganese	3.0 ug/L	3.0 ug/L	0
	Sodium	1670 ug/L	1670 ug/L	0
	Zinc	3.4 ug/L	3.8 ug/L	11
	Cyanide	ND	ND	-
WF046	**Client ID**	**31G00101**	**31G00101D**	
	Laboratory ID	**ME241003**	**ME241004**	
	Collection Date	**7/15/97**	**7/15/97**	
	Aluminum	96.0 ug/L	91.1 ug/L	5
	Barium	22.6 ug/L	22.5 ug/L	0.4
	Calcium	857 ug/L	851 ug/L	0.7
	Copper	1.3U ug/L	1.4 ug/L	Not calculable
	Iron	120 ug/L	103 ug/L	15
	Magnesium	662 ug/L	675 ug/L	2
	Manganese	9.7 ug/L	9.9 ug/L	2
	Potassium	1910 ug/L	2200 ug/L	15
	Sodium	1760 ug/L	1890 ug/L	7
	Vanadium	1.8 ug/L	1.7U ug/L	Not calculable
	Zinc	3.5 ug/L	9.8 ug/L	95
	Cyanide	ND	ND	-
WF047	**Client ID**	**39W034**	**39W034D**	
	Laboratory ID	**ME243005**	**ME243006**	
	Collection Date	**7/15/97**	**7/15/97**	
	Aluminum	94.0 ug/L	76.3 ug/L	21
	Barium	22.9 ug/L	22.8 ug/L	0.4
	Calcium	1030 ug/L	1010 ug/L	2
	Copper	8.2 ug/L	1.3U ug/L	Not calculable
	Iron	747 ug/L	751 ug/L	0.5
	Magnesium	871 ug/L	854 ug/L	2
	Manganese	12.5 ug/L	12.6 ug/L	0.8
	Sodium	2210 ug/L	2090 ug/L	6
	Zinc	14.7 ug/L	3.0 ug/L	132
WF051	**Client ID**	**16G00101**	**16G00101D**	
	Laboratory ID	**ME340009**	**ME340010**	
	Collection Date	**7/24/97**	**7/24/97**	
	Barium	20.5 ug/L	20.7 ug/L	1
	Calcium	514 ug/L	520 ug/L	1
	Copper	1.7 ug/L	1.7 ug/L	0
	Iron	11.2 ug/L	14.7 ug/L	27
	Magnesium	617 ug/L	623 ug/L	1
	Manganese	3.2 ug/L	3.0 ug/L	6
	Sodium	2130 ug/L	2110 ug/L	1
	Zinc	3.2 ug/L	8.2 ug/L	88

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF053	**Client ID**	**15G00602**	**15G00602D**	
	Laboratory ID	**ME367004**	**ME367005**	
	Collection Date	**7/27/97**	**7/27/97**	
	Aluminum	16.6U ug/L	29.9 ug/L	Not calculable
	Barium	13.0 ug/L	13.0 ug/L	0
	Calcium	676 ug/L	675 ug/L	0.1
	Chromium	3.3 ug/L	4.2 ug/L	24
	Iron	33.8 ug/L	92.6 ug/L	93
	Magnesium	504 ug/L	490 ug/L	3
	Manganese	2.3 ug/L	2.7 ug/L	16
	Sodium	2870 ug/L	2740 ug/L	5
	Zinc	3.1 ug/L	3.4 ug/L	9
WF053	**Client ID**	**15G00703**	**15G00703D**	
	Laboratory ID	**ME404003**	**ME404004**	
	Collection Date	**7/30/97**	**7/30/97**	
	Aluminum	43.6 ug/L	108 ug/L	14
	Antimony	17.3U ug/L	21.2 ug/L	Not calculable
	Barium	6.6 ug/L	6.2 ug/L	6
	Calcium	587 ug/L	549 ug/L	7
	Chromium	10.6 ug/L	13.4 ug/L	23
	Copper	2.9 ug/L	4.5 ug/L	43
	Iron	107 ug/L	115 ug/L	7
	Lead	0.93U ug/L	5.1 ug/L	Not calculable
	Magnesium	280 ug/L	266 ug/L	5
	Manganese	6.9 ug/L	6.5 ug/L	6
	Nickel	10.9 ug/L	20.3 ug/L	60
	Sodium	2040 ug/L	1820 ug/L	11
	Zinc	5.2 ug/L	6.1 ug/L	16
WF054	**Client ID**	**15G00801**	**15G00801D**	
	Laboratory ID	**ME441002**	**ME441003**	
	Collection Date	**8/4/97**	**8/4/97**	
	Aluminum	143 ug/L	116 ug/L	21
	Arsenic	2.0 ug/L	1.1U ug/L	Not calculable
	Barium	34.7 ug/L	37.3 ug/L	7
	Calcium	1870 ug/L	2010 ug/L	7
	Copper	5.2 ug/L	2.6 ug/L	67
	Iron	4760 ug/L	4940 ug/L	4
	Magnesium	1370 ug/L	1470 ug/L	7
	Manganese	84.6 ug/L	91.4 ug/L	8
	Mercury	0.04U ug/L	0.07 ug/L	Not calculable
	Sodium	1830 ug/L	1960 ug/L	7
	Thallium	0.89U ug/L	0.90 ug/L	Not calculable
	Zinc	8.5 ug/L	6.6 ug/L	25

Table XII
Summary of Analytes Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Date	Analyte	Initial Calibration r	Continuing Calibration %R	Qualifier
WF022	All	Metals Cyanide	- -	- -	None None
WF023	All	Metals Cyanide	- -	- -	None None
WF024	All	Metals Cyanide	- -	- -	None None
WF025	All	Metals Cyanide	- -	- -	None None
WF026	All	Metals Cyanide	- -	- -	None None
WF027	All	Metals Cyanide	- -	- -	None None
WF028	All	Metals Cyanide	- -	- -	None None
WF029	All	Metals Cyanide	- -	- -	None None
WF030	All	Metals Cyanide	- -	- -	None None
WF031	All	Metals Cyanide	- -	- -	None None
WF031B	All	Metals Cyanide	- -	- -	None None
WF032	All	Metals Cyanide	- -	- -	None None
WF033	All	Metals Cyanide	- -	- -	None None
WF034	All	Metals Cyanide	- -	- -	None None
WF035	All	Metals Cyanide	- -	- -	None None
WF036	All	Metals Cyanide	- -	- -	None None
WF037	All	Metals Cyanide	- -	- -	None None
WF041	All	Metals Cyanide	- -	- -	None None
WF045	All	Metals Cyanide	- -	- -	None None
WF046	All	Metals Cyanide	- -	- -	None None
WF047	All	Metals	-	-	None
WF051	All	Metals	-	-	None

Table XII
Summary of Analytes Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Date	Analyte	Initial Calibration r	Continuing Calibration %R	Qualifier
WF053	All	Metals	-	-	None
WF054	All	Metals	-	-	None

Notes: r = correlation coefficient for initial calibrations

%R = percent recovery for continuing calibrations

J = the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample because QC criteria were not met (validation "J").

UJ = the analyte was not detected above the reported sample IDL. However, the reported sample is approximate; the analyte concentration may not reliably be presumed to be less than the IDL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF022	Aluminum	6.240 ug/L	All samples in SDG WF022
	Iron	12.320 ug/L	
	Lead	0.500 ug/L	
	Sodium	38.890 ug/L	
	Zinc	3.660 ug/L	
WF023	Arsenic	-0.500 ug/L	All samples in SDG WF023
	Iron	5.980 ug/L	
	Lead	1.200 ug/L	
	Sodium	34.400 ug/L	
	Zinc	1.200 ug/L	
WF024	Aluminum	10.600 ug/L	All samples in SDG WF024
	Iron	13.190 ug/L	
	Lead	0.500 ug/L	
	Sodium	37.550 ug/L	
WF025	Aluminum	13.650 ug/L	All samples in SDG WF025
	Beryllium	-0.320 ug/L	
	Iron	7.390 ug/L	
	Selenium	0.650 ug/L	
	Zinc	1.610 ug/L	
WF026	Aluminum	17.380 ug/L	All samples in SDG WF026
	Calcium	119.520 ug/L	
	Iron	10.050 ug/L	
	Magnesium	22.940 ug/L	
	Mercury	0.140 ug/L	
	Sodium	41.280 ug/L	
	Zinc	2.510 ug/L	
	Mercury	0.20 ug/L	All samples in SDG WF026
WF027	Aluminum	18.000 ug/L	All samples in SDG WF027
	Antimony	9.280 ug/L	
	Arsenic	0.500 ug/L	
	Calcium	94.550 ug/L	
	Sodium	28.990 ug/L	
	Vanadium	1.280 ug/L	
	Mercury	0.21 ug/L	All samples in SDG WF027
WF028	Aluminum	51.600 ug/L	All samples in SDG WF028
	Antimony	-10.930 ug/L	
	Calcium	113.470 ug/L	
	Magnesium	45.540 ug/L	
	Mercury	0.140 ug/L	
	Potassium	498.120 ug/L	
	Sodium	43.870 ug/L	
	Zinc	1.230 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF029	Aluminum Barium Cobalt Iron Vanadium	10.6 ug/L 3.0 ug/L 2.7 ug/L 21.4 ug/L 1.4 ug/L	All samples in SDG WF029
	Cobalt Vanadium	2.7 ug/L 1.6 ug/L	All samples in SDG WF029
	Mercury	-0.1 ug/L	All samples in SDG WF029
	Iron Vanadium	5.3 ug/L 1.6 ug/L	All samples in SDG WF029
	Calcium Cobalt Iron Sodium Zinc	153.810 ug/L 2.390 ug/L 11.590 ug/L 37.260 ug/L 1.630 ug/L	All samples in SDG WF029
WF030	Calcium Iron Sodium	59.580 ug/L 6.080 ug/L 54.620 ug/L	All samples in SDG WF030
WF031	Mercury Potassium Silver Thallium	0.030 ug/L -617.8 ug/L -1.2 ug/L 3.3 ug/L	All samples in SDG WF031
	Mercury Potassium Silver Thallium	0.047 ug/L 34.4 ug/L -1.6 ug/L 3.7 ug/L	All samples in SDG WF031
	Mercury Potassium Silver	0.055 ug/L 542.9 ug/L -1.4 ug/L	All samples in SDG WF031
	Mercury Potassium Silver Thallium	0.070 ug/L -21.4 ug/L -1.3 ug/L 3.5 ug/L	All samples in SDG WF031
	Mercury Potassium	0.047 ug/L -411.210 ug/L	All samples in SDG WF031
	Mercury Potassium Silver Thallium	0.085 ug/L 955.8 ug/L -2.5 ug/L 3.2 ug/L	All samples in SDG WF031
	Mercury	0.127 ug/L	All samples in SDG WF031
	Mercury	0.130 ug/L	All samples in SDG WF031
	Mercury Potassium Silver	-0.030 ug/L -335.53 ug/L -1.420 ug/L	All samples in SDG WF031

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF031 cont.	Arsenic	-6.4 ug/L	All samples in SDG WF031
	Chromium	-0.4 ug/L	
	Mercury	0.034 ug/L	
	Potassium	171.0 ug/L	
	Thallium	5.1 ug/L	
	Vanadium	1.4 ug/L	
	Mercury	0.016 ug/L	All samples in SDG WF031
	Potassium	342.4 ug/L	
	Silver	-1.2 ug/L	
	Thallium	5.2 ug/L	
	Vanadium	0.8 ug/L	
	Chromium	-0.7 ug/L	All samples in SDG WF031
	Mercury	0.011 ug/L	
	Potassium	308.7 ug/L	
	Thallium	6.2 ug/L	
	Vanadium	0.7 ug/L	
	Barium	-0.2 ug/L	All samples in SDG WF031
	Chromium	-0.6 ug/L	
	Mercury	-0.021 ug/L	
	Potassium	377.6 ug/L	
	Thallium	7.2 ug/L	
	Mercury	0.014 ug/L	All samples in SDG WF031
	Arsenic	-6.7 ug/L	All samples in SDG WF031
	Barium	-0.2 ug/L	
	Chromium	-0.8 ug/L	
	Mercury	-0.032 ug/L	
	Nickel	-1.4 ug/L	
	Potassium	441.5 ug/L	
	Thallium	5.7 ug/L	
	Vanadium	0.6 ug/L	
WF031B	Copper	604 ug/L	All samples in SDG WF031B
	Aluminum	-19.5 ug/L	All samples in SDG WF031B
	Barium	0.4 ug/L	
	Copper	4.4 ug/L	
	Manganese	0.4 ug/L	
	Barium	0.4 ug/L	All samples in SDG WF031B
	Copper	6.6 ug/L	
	Iron	3.5 ug/L	
	Mercury	0.0 ug/L	
	Nickel	9.5 ug/L	
	Sodium	10.6 ug/L	
	Barium	25.130 ug/L	All samples in SDG WF031B
	Beryllium	-0.830 ug/L	
	Calcium	129.890 ug/L	
	Copper	8.310 ug/L	
	Iron	8.680 ug/L	
	Magnesium	25.430 ug/L	
	Manganese	0.490 ug/L	
	Silver	2.970 ug/L	
	Sodium	84.450 ug/L	
	Vanadium	2.060 ug/L	
	Zinc	3.100 ug/L	
	Cyanide	-0.981 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF032	Copper	4.5 ug/L	All samples in SDG WF032
	Manganese	0.5 ug/L	
	Mercury	0.0242 ug/L	
	Potassium	-1595.8 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF032
	Cobalt	0.3 ug/L	
	Copper	5.5 ug/L	
	Manganese	0.7 ug/L	
	Mercury	0.0265 ug/L	
	Sodium	17.3 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF032
	Copper	4.9 ug/L	
	Manganese	0.6 ug/L	
	Mercury	0.0255 ug/L	
	Potassium	1914.8 ug/L	
	Sodium	11.6 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF032
	Copper	5.6 ug/L	
	Manganese	0.6 ug/L	
	Mercury	-0.0178 ug/L	
	Sodium	17.4 ug/L	
	Barium	1.210 ug/L	All samples in SDG WF032
	Chromium	2.750 ug/L	
	Copper	3.390 ug/L	
	Manganese	0.410 ug/L	
	Mercury	0.015 ug/L	
	Sodium	856.490 ug/L	
	Zinc	2.310 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF032
	Beryllium	0.1 ug/L	
	Cobalt	0.4 ug/L	
	Copper	5.8 ug/L	
	Manganese	0.2 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF032
	Beryllium	0.1 ug/L	
	Copper	5.8 ug/L	
	Manganese	0.4 ug/L	
	Mercury	-0.0874 ug/L	
	Nickel	2.0 ug/L	
	Sodium	11.5 ug/L	
	Barium	0.2 ug/L	All samples in SDG WF032
	Beryllium	0.1 ug/L	
	Copper	5.6 ug/L	
	Manganese	0.5 ug/L	
	Thallium	2.6 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF032
	Beryllium	0.3 ug/L	
	Cobalt	0.6 ug/L	
	Copper	7.0 ug/L	
	Manganese	0.8 ug/L	
	Nickel	1.4 ug/L	
	Thallium	4.3 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF032 cont.	Aluminum	107.660 ug/L	All samples in SDG WF032
	Antimony	4.320 ug/L	
	Barium	1.760 ug/L	
	Cadmium	1.660 ug/L	
	Calcium	105.840 ug/L	
	Cobalt	0.430 ug/L	
	Copper	12.450 ug/L	
	Iron	54.350 ug/L	
	Magnesium	103.090 ug/L	
	Manganese	0.280 ug/L	
	Sodium	154.770 ug/L	
	Zinc	9.120 ug/L	
	Antimony	4.3 ug/L	All samples in SDG WF032
	Barium	0.4 ug/L	
	Beryllium	0.3 ug/L	
	Copper	5.2 ug/L	
	Manganese	0.6 ug/L	
	Sodium	10.2 ug/L	All samples in SDG WF032
WF033	Barium	0.3 ug/L	All samples in SDG WF033
	Beryllium	0.1 ug/L	
	Cobalt	0.4 ug/L	
	Copper	5.8 ug/L	
	Manganese	0.2 ug/L	
	Mercury	0.07 ug/L	
	Potassium	-1595.8 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF033
	Beryllium	0.1 ug/L	
	Copper	5.8 ug/L	
	Manganese	0.4 ug/L	
	Mercury	0.04 ug/L	
	Potassium	655.4 ug/L	
	Barium	0.2 ug/L	All samples in SDG WF033
	Beryllium	0.1 ug/L	
	Copper	5.6 ug/L	
	Manganese	0.5 ug/L	
	Mercury	0.05 ug/L	
	Potassium	1914.8 ug/L	
	Thallium	2.6 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF033
	Beryllium	0.3 ug/L	
	Cobalt	0.6 ug/L	
	Copper	7.0 ug/L	
	Manganese	0.8 ug/L	
	Potassium	425.8 ug/L	
	Thallium	4.3 ug/L	
	Aluminum	164.460 ug/L	All samples in SDG WF033
	Barium	1.220 ug/L	
	Calcium	107.040 ug/L	
	Copper	2.900 ug/L	
	Iron	33.430 ug/L	
	Magnesium	82.790 ug/L	
	Manganese	0.330 ug/L	
	Potassium	1602.780 ug/L	
	Sodium	221.450 ug/L	
	Zinc	1.660 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF033 cont.	Mercury	0.06 ug/L	All samples in SDG WF033
	Barium	0.4 ug/L	All samples in SDG WF033
	Beryllium	0.3 ug/L	
	Copper	5.2 ug/L	
	Manganese	0.6 ug/L	
	Mercury	0.05 ug/L	
	Potassium	163.8 ug/L	
	Antimony	4.810 ug/L	All samples in SDG WF033
	Barium	0.460 ug/L	
	Copper	2.870 ug/L	
	Manganese	0.330 ug/L	
	Potassium	509.990 ug/L	
	Sodium	137.200 ug/L	
	Zinc	3.200 ug/L	
	Barium	0.8 ug/L	All samples in SDG WF033
	Beryllium	0.6 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.0 ug/L	
	Potassium	1734.0 ug/L	
	Thallium	2.4 ug/L	
	Vanadium	1.1 ug/L	
	Barium	1.2 ug/L	All samples in SDG WF033
	Beryllium	0.8 ug/L	
	Cadmium	0.9 ug/L	
	Chromium	1.2 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.3 ug/L	
	Potassium	1605.5 ug/L	
	Thallium	3.4 ug/L	
	Vanadium	1.8 ug/L	
	Barium	1.1 ug/L	All samples in SDG WF033
	Beryllium	0.8 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	1.1 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.2 ug/L	
	Potassium	768.8 ug/L	
	Thallium	3.2 ug/L	
	Vanadium	1.7 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF033
	Beryllium	0.7 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	0.8 ug/L	
	Manganese	1.0 ug/L	
	Potassium	314.6 ug/L	
	Vanadium	1.2 ug/L	

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Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF033 cont.	Barium	1.0 ug/L	All samples in SDG WF033
	Beryllium	0.6 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Potassium	684.9 ug/L	
	Thallium	2.2 ug/L	
	Vanadium	1.2 ug/L	
	Barium	0.9 ug/L	All samples in SDG WF033
	Beryllium	0.7 ug/L	
	Cadmium	0.7 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Potassium	722.1 ug/L	
	Thallium	3.4 ug/L	
	Vanadium	1.2 ug/L	
WF034	Copper	5.8 ug/L	All samples in SDG WF034
	Mercury	0.023 ug/L	
	Copper	5.8 ug/L	All samples in SDG WF034
	Manganese	0.4 ug/L	
	Mercury	0.017 ug/L	
	Beryllium	0.1 ug/L	All samples in SDG WF034
	Copper	5.6 ug/L	
	Manganese	0.5 ug/L	
	Mercury	0.030 ug/L	
	Beryllium	0.3 ug/L	All samples in SDG WF034
	Copper	7.0 ug/L	
	Manganese	0.8 ug/L	
	Mercury	0.042 ug/L	
	Sodium	10.2 ug/L	
	Barium	0.460 ug/L	66G02001
	Copper	2.870 ug/L	66G00302
	Sodium	137.200 ug/L	66G01801
	Zinc	3.200 ug/L	30G00301
	Cyanide	-1.327 ug/L	30G00401
			66R02201
			30G00301D
	Mercury	0.024 ug/L	All samples in SDG WF034
	Beryllium	0.3 ug/L	All samples in SDG WF034
	Copper	5.2 ug/L	
	Manganese	0.6 ug/L	
	Mercury	0.026 ug/L	
	Mercury	0.040 ug/L	All samples in SDG WF034
	Mercury	0.033 ug/L	All samples in SDG WF034

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF034 cont.	Arsenic	-13.610 ug/L	66G01101
	Barium	1.700 ug/L	66G01301
	Beryllium	-0.710 ug/L	66G00501
	Calcium	108.610 ug/L	66G00501F
	Copper	1.700 ug/L	
	Lead	-8.620 ug/L	
	Manganese	0.790 ug/L	
	Selenium	10.810 ug/L	
	Sodium	70.400 ug/L	
	Zinc	3.200 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF034
	Silver	3.3 ug/L	
	Sodium	11.9 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF034
	Manganese	0.4 ug/L	
	Silver	2.2 ug/L	
	Sodium	12.2 ug/L	
	Beryllium	0.5 ug/L	All samples in SDG WF034
	Copper	1.9 ug/L	
	Manganese	0.6 ug/L	
	Sodium	20.0 ug/L	
	Beryllium	0.1 ug/L	All samples in SDG WF034
	Silver	2.6 ug/L	
	Sodium	17.3 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF034
	Manganese	0.4 ug/L	
	Sodium	9.7 ug/L	
WF035	Barium	0.8 ug/L	All samples in SDG WF035
	Beryllium	0.6 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.0239 ug/L	
	Thallium	2.4 ug/L	
	Barium	1.2 ug/L	All samples in SDG WF035
	Beryllium	0.8 ug/L	
	Manganese	1.3 ug/L	
	Mercury	0.0256 ug/L	
	Thallium	3.4 ug/L	
	Barium	1.1 ug/L	All samples in SDG WF035
	Beryllium	0.8 ug/L	
	Manganese	1.2 ug/L	
	Mercury	0.0401 ug/L	
	Thallium	3.2 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF035
	Beryllium	0.7 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.334 ug/L	
	Aluminum	101.120 ug/L	All samples in SDG WF035
	Barium	0.410 ug/L	
	Iron	56.400 ug/L	
	Manganese	0.430 ug/L	
	Sodium	152.450 ug/L	
	Zinc	2.190 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF035 cont.	Barium	1.0 ug/L	All samples in SDG WF035
	Beryllium	0.6 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.0250 ug/L	
	Thallium	2.2 ug/L	
	Barium	0.9 ug/L	All samples in SDG WF035
	Beryllium	0.7 ug/L	
	Manganese	1.0 ug/L	
	Thallium	3.4 ug/L	
	Barium	0.570 ug/L	All samples in SDG WF035
	Beryllium	-0.910 ug/L	
	Calcium	109.820 ug/L	
	Copper	5.470 ug/L	
	Manganese	0.720 ug/L	
	Zinc	4.400 ug/L	
	Manganese	0.6 ug/L	All samples in SDG WF035
	Manganese	0.4 ug/L	All samples in SDG WF035
	Barium	0.4 ug/L	All samples in SDG WF035
	Beryllium	-0.2 ug/L	
	Manganese	0.6 ug/L	
	Beryllium	-0.2 ug/L	All samples in SDG WF035
	Manganese	0.6 ug/L	
	Beryllium	-0.2 ug/L	All samples in SDG WF035
	Manganese	0.4 ug/L	
WF036	Aluminum	17.7 ug/L	All samples in SDG WF036
	Barium	0.8 ug/L	
	Beryllium	0.6 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.0265 ug/L	
	Thallium	2.4 ug/L	
	Vanadium	1.1 ug/L	
	Aluminum	18.4 ug/L	All samples in SDG WF036
	Barium	1.2 ug/L	
	Beryllium	0.8 ug/L	
	Cadmium	0.9 ug/L	
	Chromium	1.2 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.3 ug/L	
	Mercury	0.0251 ug/L	
	Thallium	3.4 ug/L	
	Vanadium	1.8 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF036 cont.	Aluminum	14.7 ug/L	All samples in SDG WF036
	Barium	1.1 ug/L	
	Beryllium	0.8 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	1.1 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.2 ug/L	
	Mercury	0.0165 ug/L	
	Thallium	3.2 ug/L	
	Vanadium	1.7 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF036
	Beryllium	0.7 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	0.8 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.0157 ug/L	
	Vanadium	1.2 ug/L	
	Aluminum	63.950 ug/L	All samples in SDG WF036
	Barium	0.730 ug/L	
	Chromium	0.490 ug/L	
	Manganese	0.430 ug/L	
	Mercury	0.014 ug/L	
	Potassium	1817.440 ug/L	
	Cyanide	-1.333 ug/L	
	Barium	1.0 ug/L	All samples in SDG WF036
	Beryllium	0.6 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Thallium	2.2 ug/L	
	Vanadium	1.2 ug/L	
	Aluminum	91.5 ug/L	All samples in SDG WF036
	Barium	0.9 ug/L	
	Beryllium	0.7 ug/L	
	Cadmium	0.7 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Thallium	3.4 ug/L	
	Vanadium	1.2 ug/L	
WF037	Copper	6.4 ug/L	All samples in SDG WF037
	Aluminum	-19.5 ug/L	All samples in SDG WF037
	Barium	0.4 ug/L	
	Copper	4.4 ug/L	
	Barium	0.4 ug/L	All samples in SDG WF037
	Copper	6.6 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF037 cont.	Barium	25.130 ug/L	All samples in SDG WF037
	Beryllium	-0.830 ug/L	
	Calcium	129.890 ug/L	
	Copper	8.310 ug/L	
	Iron	8.680 ug/L	
	Magnesium	25.430 ug/L	
	Manganese	0.490 ug/L	
	Silver	2.970 ug/L	
	Sodium	84.450 ug/L	
	Vanadium	2.060 ug/L	
	Zinc	3.100 ug/L	
	Cyanide	-0.981 ug/L	
WF041	Cyanide	-0.6 ug/L	All samples in SDG WF041
	Barium	0.5 ug/L	All samples in SDG WF041
	Sodium	12.2 ug/L	All samples in SDG WF041
	Cyanide	-0.4 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF041
	Sodium	16.3 ug/L	
	Beryllium	-1.010 ug/L	All samples in SDG WF041
	Calcium	133.200 ug/L	
	Copper	3.740 ug/L	
	Iron	9.490 ug/L	
	Lead	1.260 ug/L	
	Sodium	93.470 ug/L	
	Thallium	1.310 ug/L	
	Zinc	19.070 ug/L	
	Cyanide	-1.002 ug/L	
	Barium	-0.6 ug/L	All samples in SDG WF041
	Chromium	-2.9 ug/L	
	Copper	-1.7 ug/L	
	Magnesium	-22.9 ug/L	
	Silver	-2.8 ug/L	
	Vanadium	-3.0 ug/L	
	Copper	6.4 ug/L	All samples in SDG WF041
	Thallium	1.4 ug/L	
	Vanadium	-1.9 ug/L	
	Cobalt	8.9 ug/L	All samples in SDG WF041
	Thallium	1.6 ug/L	
	Cyanide	-0.4 ug/L	
	Beryllium	-0.830 ug/L	All samples in SDG WF041
	Calcium	105.800 ug/L	
	Iron	3.860 ug/L	
	Selenium	-3.230 ug/L	
	Sodium	15.150 ug/L	
	Vanadium	-2.240 ug/L	
	Zinc	0.940 ug/L	
	Selenium	-3.4 ug/L	All samples in SDG WF041
	Thallium	-1.3 ug/L	
	Lead	1.2 ug/L	All samples in SDG WF041
	Selenium	-2.6 ug/L	
	Cyanide	-0.4 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF041 cont.	Selenium Thallium	-3.1 ug/L 1.3 ug/L	All samples in SDG WF041
	Selenium Cyanide	-2.8 ug/L -0.5 ug/L	All samples in SDG WF041
	Thallium Cyanide	-1.0 ug/L -0.4 ug/L	All samples in SDG WF041
	Cyanide	0.4 ug/L	All samples in SDG WF041
	Cyanide	0.4 ug/L	All samples in SDG WF041
	Cyanide	0.4 ug/L	All samples in SDG WF041
WF045	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Manganese	0.4 ug/L	All samples in SDG WF045
	Vanadium	1.8 ug/L	All samples in SDG WF045
	Beryllium Calcium Iron Sodium Vanadium Zinc Cyanide	-0.860 ug/L 136.80 ug/L 5.390 ug/L 32.780 ug/L -1.730 ug/L 3.340 ug/L -1.013 ug/L	All samples in SDG WF045
	Mercury	0.1 ug/L	All samples in SDG WF045
	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Thallium Cyanide	1.1 ug/L -0.6 ug/L	All samples in SDG WF045
	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Aluminum Barium Beryllium Calcium Iron Sodium Thallium Zinc Cyanide	17.320 ug/L 0.450 ug/L -0.550 ug/L 121.820 ug/L 6.770 ug/L 45.700 ug/L -1.390 ug/L 2.510 ug/L -0.899 ug/L	All samples in SDG WF045
	Beryllium Manganese Sodium	0.2 ug/L 0.5 ug/L 17.2 ug/L	OWG00401 OWG00201
	Beryllium Manganese Sodium Zinc	0.2 ug/L 0.7 ug/L 12.2 ug/L 1.0 ug/L	OWG00401 OWG00201

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NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF045 cont.	Barium Beryllium Chromium Manganese Sodium Thallium Vanadium Zinc	0.9 ug/L 0.5 ug/L 3.0 ug/L 1.0 ug/L 19.9 ug/L 1.2 ug/L 2.0 ug/L 1.6 ug/L	OWG00401 OWG00201
	Cyanide	-0.377 ug/L	OWG00401 OWG00201
	Beryllium Sodium	0.2 ug/L 11.0 ug/L	OWG00401 OWG00201
	Selenium	-2.2 ug/L	OWG00401 OWG00201
	Thallium	-1.0 ug/L	OWG00401 OWG00201
WF046	Beryllium Sodium	0.2 ug/L 17.2 ug/L	All samples in SDG WF046
	Beryllium Mercury Sodium	0.2 ug/L 0.040 ug/L 12.2 ug/L	All samples in SDG WF046
	Beryllium Mercury Sodium	0.5 ug/L 0.043 ug/L 19.9 ug/L	All samples in SDG WF046
	Aluminum Barium Beryllium Calcium Iron Sodium Thallium Zinc Boron	17.320 ug/L 0.450 ug/L -0.550 ug/L 121.820 ug/L 6.770 ug/L 45.700 ug/L -1.390 ug/L 2.510 ug/L -0.377 ug/L	All samples in SDG WF046
	Beryllium Sodium	0.2 ug/L 11.0 ug/L	All samples in SDG WF046
WF047	Beryllium Manganese Mercury Sodium	0.2 ug/L 0.5 ug/L 0.1 ug/L 17.2 ug/L	All samples in SDG WF047
	Beryllium Manganese Sodium Zinc	0.2 ug/L 0.7 ug/L 12.2 ug/L 1.0 ug/L	All samples in SDG WF047
	Barium Beryllium Chromium Manganese Sodium Thallium Vanadium Zinc	0.9 ug/L 0.5 ug/L 3.0 ug/L 1.0 ug/L 19.9 ug/L 1.1 ug/L 2.0 ug/L 1.6 ug/L	All samples in SDG WF047

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Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF047 cont.	Aluminum	17.320 ug/L	All samples in SDG WF047
	Barium	0.450 ug/L	
	Beryllium	-0.550 ug/L	
	Calcium	121.820 ug/L	
	Iron	6.770 ug/L	
	Sodium	45.700 ug/L	
	Thallium	-1.390 ug/L	
	Zinc	2.510 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF047
	Sodium	11.0 ug/L	
	Selenium	-2.2 ug/L	All samples in SDG WF047
WF051	Barium	1.0 ug/L	All samples in SDG WF051
	Beryllium	0.2 ug/L	
	Chromium	3.4 ug/L	
	Copper	1.5 ug/L	
	Manganese	0.5 ug/L	
	Silver	2.8 ug/L	
	Vanadium	2.4 ug/L	
	Manganese	-0.5 ug/L	All samples in SDG WF051
	Mercury	0.04 ug/L	
	Vanadium	1.8 ug/L	
	Arsenic	1.1 ug/L	All samples in SDG WF051
	Mercury	0.04 ug/L	
	Selenium	-1.9 ug/L	
	Manganese	-0.5 ug/L	All samples in SDG WF051
	Mercury	0.07 ug/L	
	Beryllium	-0.800 ug/L	All samples in SDG WF051
	Calcium	140.860 ug/L	
	Iron	5.470 ug/L	
	Sodium	36.740 ug/L	
	Zinc	1.980 ug/L	
	Mercury	0.08 ug/L	All samples in SDG WF051
	Silver	-2.4 ug/L	
	Aluminum	16.800 ug/L	All samples in SDG WF051
	Barium	0.600 ug/L	
	Beryllium	-0.680 ug/L	
	Calcium	127.440 ug/L	
	Chromium	3.050 ug/L	
	Cobalt	2.850 ug/L	
	Copper	2.120 ug/L	
	Iron	10.740 ug/L	
	Manganese	0.690 ug/L	
	Silver	3.040 ug/L	
	Sodium	54.160 ug/L	
	Vanadium	2.700 ug/L	
	Zinc	2.710 ug/L	
	Calcium	42.0 ug/L	All samples in SDG WF051

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	**Analyte**	**Concentration**	**Associated Samples**
WF051 cont.	Barium	0.6 ug/L	All samples in SDG WF051
	Beryllium	0.4 ug/L	
	Cobalt	2.6 ug/L	
	Copper	1.7 ug/L	
	Manganese	0.9 ug/L	
	Zinc	1.2 ug/L	
	Manganese	0.7 ug/L	All samples in SDG WF051
	Arsenic	-1.130 ug/L	All samples in SDG WF051
	Beryllium	-0.720 ug/L	
	Calcium	131.080 ug/L	
	Iron	12.060 ug/L	
	Zinc	4.540 ug/L	
	Lead	-1.3 ug/L	All samples in SDG WF051
	Lead	-1.4 ug/L	All samples in SDG WF051
	Magnesium	0.5 ug/L	
	Lead	-1.6 ug/L	All samples in SDG WF051
	Aluminum	18.640 ug/L	All samples in SDG WF051
	Barium	0.490 ug/L	
	Beryllium	-0.760 ug/L	
	Calcium	134.210 ug/L	
	Chromium	3.850 ug/L	
	Iron	35.410 ug/L	
	Manganese	0.500 ug/L	
	Sodium	35.200 ug/L	
	Zinc	2.300 ug/L	
	Lead	-2.0 ug/L	All samples in SDG WF051
	Vanadium	2.0 ug/L	
	Barium	0.9 ug/L	All samples in SDG WF051
	Beryllium	0.3 ug/L	
	Lead	-2.0 ug/L	
	Manganese	0.7 ug/L	
	Sodium	9.2 ug/L	
	Sodium	15.0 ug/L	All samples in SDG WF051
	Arsenic	-1.6 ug/L	All samples in SDG WF051
WF053	Aluminum	18.640 ug/L	All samples in SDG WF053
	Barium	0.490 ug/L	
	Beryllium	-0.760 ug/L	
	Calcium	134.210 ug/L	
	Chromium	3.850 ug/L	
	Iron	35.410 ug/L	
	Manganese	0.500 ug/L	
	Sodium	35.200 ug/L	
	Zinc	2.330 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	**Analyte**	**Concentration**	**Associated Samples**
WF053 cont.	Barium	-0.760 ug/L	All samples in SDG WF053
	Calcium	138.650 ug/L	
	Chromium	3.750 ug/L	
	Copper	3.390 ug/L	
	Iron	14.500 ug/L	
	Manganese	0.490 ug/L	
	Nickel	8.370 ug/L	
	Sodium	42.790 ug/L	
	Zinc	2.940 ug/L	
	Aluminum	26.970 ug/L	All samples in SDG WF053
	Beryllium	-0.710 ug/L	
	Calcium	151.990 ug/L	
	Iron	16.430 ug/L	
	Manganese	0.580 ug/L	
	Silver	4.360 ug/L	
	Sodium	52.750 ug/L	
	Zinc	3.720 ug/L	
	Beryllium	-0.970 ug/L	All samples in SDG WF053
	Calcium	130.780 ug/L	
	Copper	1.480 ug/L	
	Iron	19.510 ug/L	
	Lead	-1.380 ug/L	
	Manganese	0.780 ug/L	
	Sodium	13.170 ug/L	
	Zinc	6.090 ug/L	
	Aluminum	52.990 ug/L	All samples in SDG WF053
	Arsenic	1.300 ug/L	
	Beryllium	-0.940 ug/L	
	Calcium	198.990 ug/L	
	Chromium	6.790 ug/L	
	Copper	2.230 ug/L	
	Iron	38.980 ug/L	
	Lead	-1.460 ug/L	
	Manganese	1.000 ug/L	
	Sodium	60.080 ug/L	
	Zinc	2.040 ug/L	
WF054	Mercury	0.1 ug/L	All samples in SDG WF054
	Mercury	0.1 ug/L	All samples in SDG WF054
	Mercury	0.1 ug/L	All samples in SDG WF054
	Beryllium	-0.980 ug/L	All samples in SDG WF054
	Calcium	110.890 ug/L	
	Iron	9.300 ug/L	
	Mercury	0.052 ug/L	
	Vanadium	-2.660 ug/L	
	Zinc	2.260 ug/L	

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF022	**Client ID:**	**BKR01001**		
	Laboratory ID:	**RB858002**		
	Collection Date:	**7/16/96**		
	Type:	**Equipment rinsate**		
	Sodium		43.4 ug/L	None
	Aluminum		55.9 ug/L	23.9U ug/L[1]
	Calcium		69.0 ug/L	None
	Iron		23.9 ug/L	43.4U ug/L[1]
	Magnesium		39.7 ug/L	None
	Mercury		0.10 ug/L	None
	Zinc		1.2 ug/L	1.2U ug/L[1]
WF022	**Client ID:**	**BKF01001**		
	Laboratory ID:	**RB858010**		
	Collection Date:	**7/17/96**		
	Type:	**Source blank**		
	Sodium		61.3 ug/L	61.3U ug/L[1]
WF023	**Client ID:**	**01R01101**		
	Laboratory ID:	**RB887005**		
	Collection Date:	**7/23/96**		
	Type:	**Equipment rinsate**		
	Aluminum		13.3 ug/L	None
	Iron		10.8 ug/L	10.8U ug/L[1]
	Zinc		1.2 ug/L	1.2U ug/L[1]
	Cyanide		2.6 ug/L	None
WF024	**Client ID:**	**15R01201**		
	Laboratory ID:	**RB920005**		
	Collection Date:	**7/31/96**		
	Type:	**Equipment rinsate**		
	Aluminum		13.8 ug/L	13.8U ug/L[1]
	Iron		10.5 ug/L	10.5U ug/L[1]
	Sodium		55.4 ug/L	55.4U ug/L[1]
	Cyanide		2.6 ug/L	None
WF025	**Client ID:**	**15R01301**		
	Laboratory ID:	**RB956011**		
	Collection Date:	**8/7/96**		
	Type:	**Equipment rinsate**		
	Iron		5.3 ug/L	5.3U ug/L[1]
	Sodium		26.6 ug/L	None
	Zinc		1.8 ug/L	1.8U ug/L[1]
WF026	**Client ID:**	**15R01401**		
	Laboratory ID:	**RB980012**		
	Collection Date:	**8/14/96**		
	Type:	**Equipment rinsate**		
	Iron		14.8 ug/L	14.8U ug/L[1]
	Zinc		1.1 ug/L	1.1U ug/L[1]
	Cyanide		1.8 ug/L	None

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF027	**Client ID:**	16R01501		
	Laboratory ID:	RC016012		
	Collection Date:	8/21/96		
	Type:	Equipment rinsate		
	Arsenic		0.50 ug/L	0.50U ug/L[1]
	Calcium		64.0 ug/L	64.0U ug/L[1]
	Lead		0.80 ug/L	None
	Sodium		26.9 ug/L	26.9U ug/L[1]
	Zinc		1.8 ug/L	None
WF028	**Client ID:**	11R01601		
	Laboratory ID:	RC044016		
	Collection Date:	8/28/96		
	Type:	Equipment rinsate		
	Calcium		67.2 ug/L	67.2U ug/L[1]
	Sodium		30.8 ug/L	30.8U ug/L[1]
	Cyanide		1.5 ug/L	None
WF029	**Client ID:**	13R01701		
	Laboratory ID:	RC092008		
	Collection Date:	9/11/96		
	Type:	Equipment rinsate		
	Calcium		66.4 ug/L	66.4U ug/L[1]
	Sodium		25.4 ug/L	25.4U ug/L[1]
	Zinc		1.8 ug/L	1.8U ug/L[1]
WF030	**Client ID:**	66R01801		
	Laboratory ID:	RC121010		
	Collection Date:	9/18/96		
	Type:	Equipment rinsate		
	Calcium		55.7 ug/L	55.7U ug/L[1]
	Iron		9.2 ug/L	9.2U ug/L[1]
	Selenium		0.68 ug/L	None
	Sodium		24.9 ug/L	24.9U ug/L[1]
	Zinc		2.0 ug/L	None
WF031	**Client ID:**	05R01901		
	Laboratory ID:	MB928011		
	Collection Date:	9/25/96		
	Type:	Equipment rinsate		
	Barium		0.34 ug/L	None
	Manganese		0.38 ug/L	None
	Mercury		0.06 ug/L	0.06U ug/L[1]
	Zinc		2.0 ug/L	None
WF032	**Client ID:**	06R02001		
	Laboratory ID:	MC011006		
	Collection Date:	10/2/96		
	Type:	Equipment rinsate		
	Barium		2.8 ug/L	2.8U ug/L[1]
	Chromium		2.5 ug/L	2.5U ug/L[1]
	Copper		2.9 ug/L	2.9U ug/L[1]
	Manganese		0.48 ug/L	0.48U ug/L[1]
	Mercury		0.01 ug/L	0.01U ug/L[1]
	Sodium		365 ug/L	None
	Zinc		3.0 ug/L	3.0U ug/L[1]
	Cyanide		1.4 ug/L	None

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF033	**Client ID:**	**66R02101**		
	Laboratory ID:	**MC085007**		
	Collection Date:	**10/9/96**		
	Type:	**Equipment rinsate**		
	Barium		1.6 ug/L	1.6U ug/L[1]
	Beryllium		0.32 ug/L	0.32U ug/L[1]
	Chromium		0.55 ug/L	0.55U ug/L[1]
	Cobalt		0.84 ug/L	0.84U ug/L[1]
	Manganese		2.4 ug/L	2.4U ug/L[1]
	Potassium		777 ug/L	777U ug/L[1]
	Sodium		334 ug/L	334U ug/L[1]
	Vanadium		0.63 ug/L	0.63U ug/L[1]
	Zinc		1.4 ug/L	1.4U ug/L[1]
WF034	**Client ID:**	**66R0201**		
	Laboratory ID:	**MC153007**		
	Collection Date:	**10/16/96**		
	Type:	**Equipment rinsate**		
	Barium		0.56 ug/L	0.56 ug/L[1]
	Manganese		0.44 ug/L	0.44 ug/L[1]
	Mercury		0.02 ug/L	0.02 ug/L[1]
	Sodium		119 ug/L	119 ug/L[1]
	Zinc		2.2 ug/L	2.2 ug/L[1]
WF035	**Client ID:**	**66R02301**		
	Laboratory ID:	**MC214006**		
	Collection Date:	**10/23/96**		
	Type:	**Equipment rinsate**		
	Aluminum		30.7 ug/L	30.7 ug/L[1]
	Barium		1.3 ug/L	1.3 ug/L[1]
	Calcium		101 ug/L	101 ug/L[1]
	Manganese		0.94 ug/L	0.94 ug/L[1]
	Mercury		0.03 ug/L	0.03 ug/L[1]
	Sodium		100 ug/L	100 ug/L[1]
	Zinc		2.4 ug/L	2.4 ug/L[1]
WF036	**Client ID:**	**54R02401**		
	Laboratory ID:	**MC262007**		
	Collection Date:	**10/30/96**		
	Type:	**Equipment rinsate**		
	Aluminum		14.8 ug/L	14.8 ug/L[1]
	Barium		0.59 ug/L	0.59 ug/L[1]
	Chromium		0.48 ug/L	0.48 ug/L[1]
	Manganese		0.32 ug/L	0.32 ug/L[1]
	Potassium		756 ug/L	756 ug/L[1]
	Sodium		265 ug/L	None
	Zinc		1.4 ug/L	None
WF037	**Client ID:**	**15F00201**		
	Laboratory ID:	**MC424010**		
	Collection Date:	**12/2/96**		
	Type:	**Source blank**		
	Barium		1.2 ug/L	None
	Calcium		111 ug/L	None
	Copper		6.8 ug/L	None
	Manganese		0.43 ug/L	None
	Sodium		95.7 ug/L	None
	Zinc		2.6 ug/L	None

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF041	**Client ID:**	35F00301		
	Laboratory ID:	MD908002		
	Collection Date:	6/11/97		
	Type:	**Source blank**		
	Barium		0.78 ug/L	None
	Calcium		164 ug/L	164U ug/L[1]
	Copper		10.3 ug/L	10.3U ug/L[1]
	Iron		35.6 ug/L	35.6U ug/L[1]
	Lead		1.0 ug/L	1.0U ug/L[1]
	Manganese		0.88 ug/L	None
	Sodium		129 ug/L	129U ug/L[1]
	Zinc		13.3 ug/L	13.3U ug/L[1]
WF041	**Client ID:**	35R03001		
	Laboratory ID:	MD908003		
	Collection Date:	6/11/97		
	Type:	**Equipment rinsate**		
	Barium		1.0 ug/L	None
	Calcium		165 ug/L	165U ug/L[1]
	Copper		4.9 ug/L	4.9U ug/L[1]
	Iron		10.7 ug/L	10.7U ug/L[1]
	Manganese		1.2 ug/L	None
	Sodium		148 ug/L	148U ug/L[1]
	Thallium		1.7 ug/L	1.7U ug/L[1]
	Zinc		15.8 ug/L	15.8U ug/L[1]
WF045	**Client ID:**	OWR03401		
	Laboratory ID:	ME149002		
	Collection Date:	7/7/97		
	Type:	**Equipment rinsate**		
	Barium		0.44 ug/L	0.44U ug/L[1]
	Calcium		133 ug/L	133U ug/L[1]
	Copper		1.8 ug/L	None
	Iron		7.1 ug/L	7.1U ug/L[1]
	Sodium		60.4 ug/L	60.4U ug/L[1]
	Zinc		1.7 ug/L	1.7U ug/L[1]
WF046	**Client ID:**	31R03301		
	Laboratory ID:	MW241002		
	Collection Date:	7/15/97		
	Type:	**Equipment rinsate**		
	Barium		1.1 ug/L	1.1U ug/L[1]
	Calcium		126 ug/L	126U ug/L[1]
	Iron		4.4 ug/L	4.4U ug/L[1]
	Manganese		0.40 ug/L	None
	Sodium		65.6 ug/L	65.6U ug/L[1]
	Zinc		5.4 ug/L	5.4U ug/L[1]

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF051	**Client ID:**	16R03601		
	Laboratory ID:	ME340005		
	Collection Date:	7/23/97		
	Type:	Equipment rinsate		
	Calcium		166 ug/L	166U ug/L[1]
	Copper		1.7 ug/L	1.7U ug/L[1]
	Iron		12.7 ug/L	12.7U ug/L[1]
	Lead		1.2 ug/L	None
	Manganese		0.68 ug/L	0.68U ug/L[1]
	Sodium		48.9 ug/L	48.9U ug/L[1]
	Zinc		2.6 ug/L	2.6U ug/L[1]
WF053	**Client ID:**	15R03701		
	Laboratory ID:	ME367002		
	Collection Date:	7/27/97		
	Type:	Equipment rinsate		
	Barium		1.6 ug/L	None
	Calcium		134 ug/L	134U ug/L[1]
	Chromium		4.2 ug/L	4.2U ug/L[1]
	Copper		2.1 ug/L	2.1U ug/L[1]
	Iron		18.4 ug/L	None
	Manganese		0.69 ug/L	0.69U ug/L[1]
	Sodium		83.0 ug/L	83.0U ug/L[1]
	Zinc		5.0 ug/L	5.0U ug/L[1]
WF054	**Client ID:**	15R03801		
	Laboratory ID:	ME441005		
	Collection Date:	8/5/97		
	Type:	Equipment rinsate		
	Cadmium		4.7 ug/L	
	Calcium		159 ug/L	159U ug/L[1]
	Copper		1.3 ug/L	None
	Iron		13.3 ug/L	13.3U ug/L[1]
	Manganese		0.48 ug/L	None
	Mercury		0.05 ug/L	0.05U ug/L[1]
	Sodium		20.0 ug/L	None
	Zinc		1.8 ug/L	None
WF054	**Client ID:**	30R03901		
	Laboratory ID:	ME450002		
	Collection Date:	8/6/97		
	Type:	Equipment rinsate		
	Aluminum		16.7 ug/L	None
	Barium		0.78 ug/L	None
	Calcium		150 ug/L	150U ug/L
	Copper		3.7 ug/L	None
	Iron		14.0 ug/L	14.0U ug/L
	Manganese		0.58 ug/L	None
	Sodium		67.0 ug/L	None
	Zinc		4.4 ug/L	None

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

Table XV
Sample Event PARCC Summary
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF022	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF023	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF024	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF025	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF026	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF027	Volatiles	Acceptable	Acceptable	Acceptable	99.0	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF028	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF029	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF030	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF031	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	**Unacceptable**	Acceptable	**0**	Acceptable
WF031B	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF032	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	99.3	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable

Table XV
Sample Event PARCC Summary
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF033	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF034	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF035	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF036	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF037	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	**Unacceptable**	Acceptable	**0**	Acceptable
WF038	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF039	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF040	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF041	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides & PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF042	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF043	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF044	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF045	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides & PCBs	**Unacceptable**	**Unacceptable**	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF046	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides & PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF047	Volatiles	Acceptable	Acceptable	Acceptable	97.0	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
WF048	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF049	Volatiles	Acceptable	Acceptable	Acceptable	95.2	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF051	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
WF052	Volatiles	Acceptable	Acceptable	Acceptable	94.3	Acceptable

Table XV
Sample Event PARCC Summary
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF053	Volatiles Metals	Acceptable Acceptable	Acceptable Acceptable	Acceptable Acceptable	100 100	Acceptable Acceptable
WF054	Volatiles Metals	Acceptable Acceptable	Acceptable Acceptable	Acceptable Acceptable	100 100	Acceptable Acceptable
WF055	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable

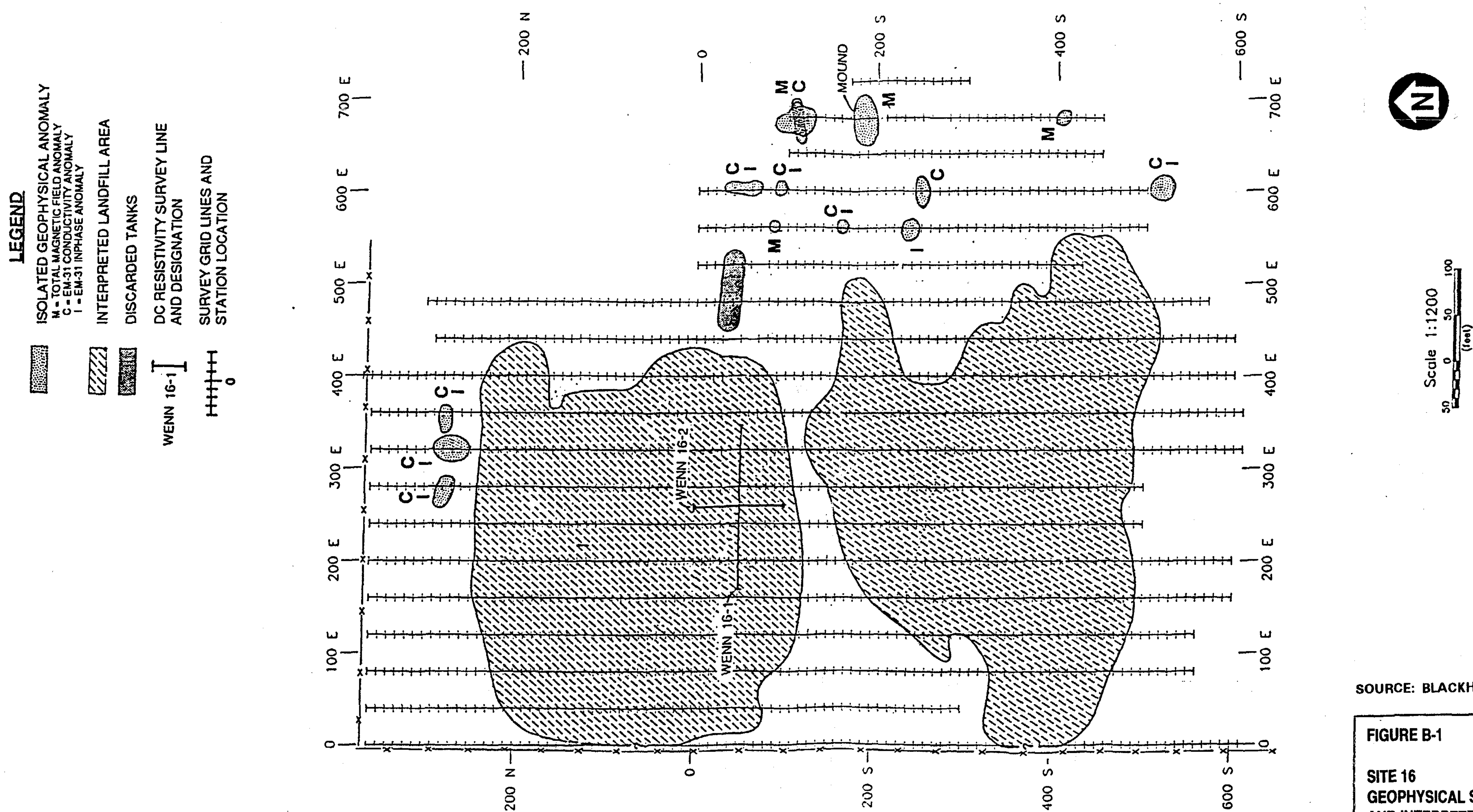
[1]Cumulative of sampling and analytical components
[2]Analytical component.
[3]Samples results rejected for database purposes were not used in the completeness calculation.

Notes: All completeness is expressed as the ratio of number of sample results considered usable (i.e., not qualified as rejected) to the total number of sample results.

% = percent

APPENDIX B

GEOPHYSICAL DATA



SOURCE: BLACKHAWK GEOSCIENCES, INC. 1992.

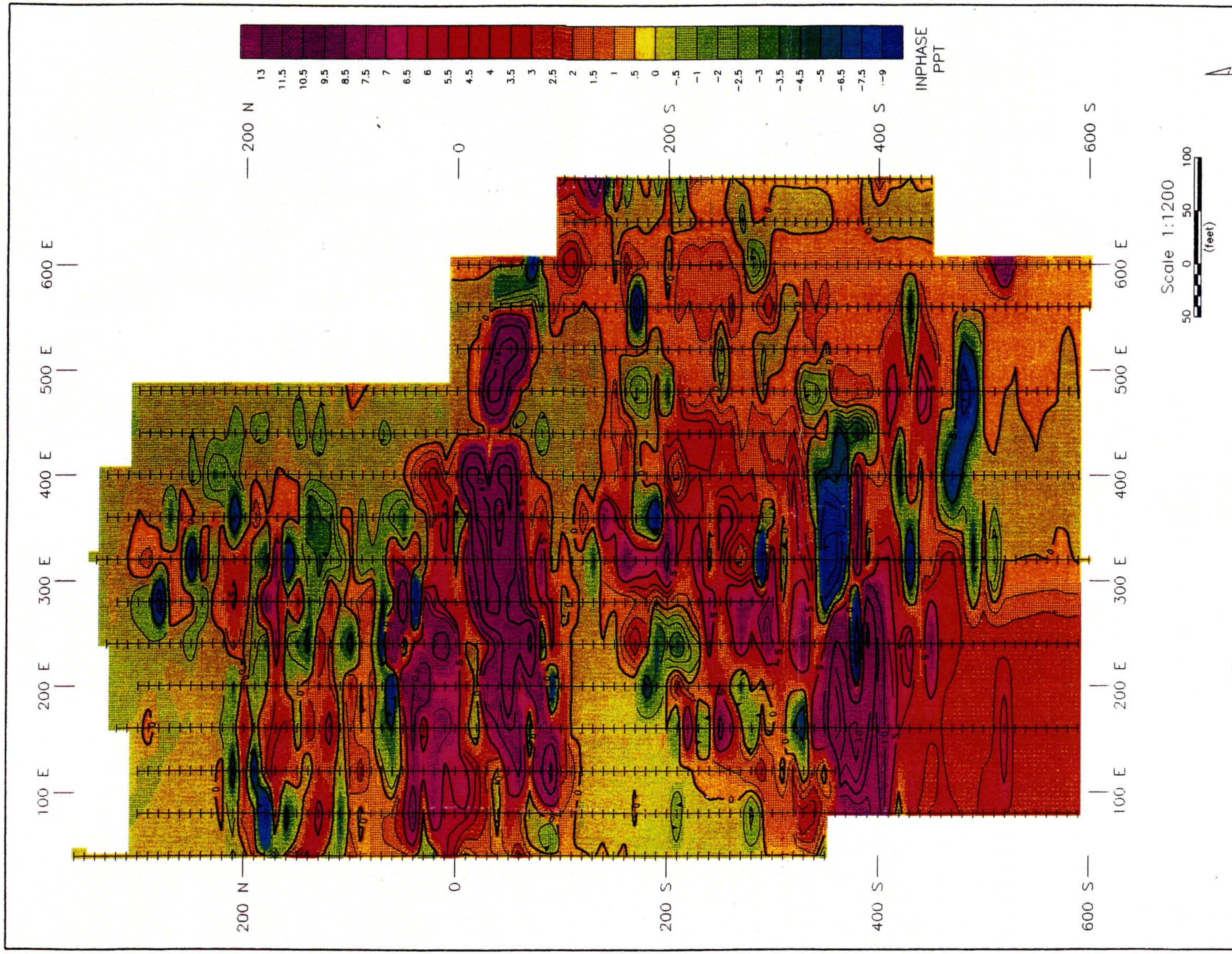
FIGURE B-1

SITE 16
GEOPHYSICAL SURVEY GRID LINES
AND INTERPETED ANOMALY LOCATIONS

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND
BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

00248C06Z



SOURCE: BLACKHAWK GEOSCIENCES, INC. 1992.

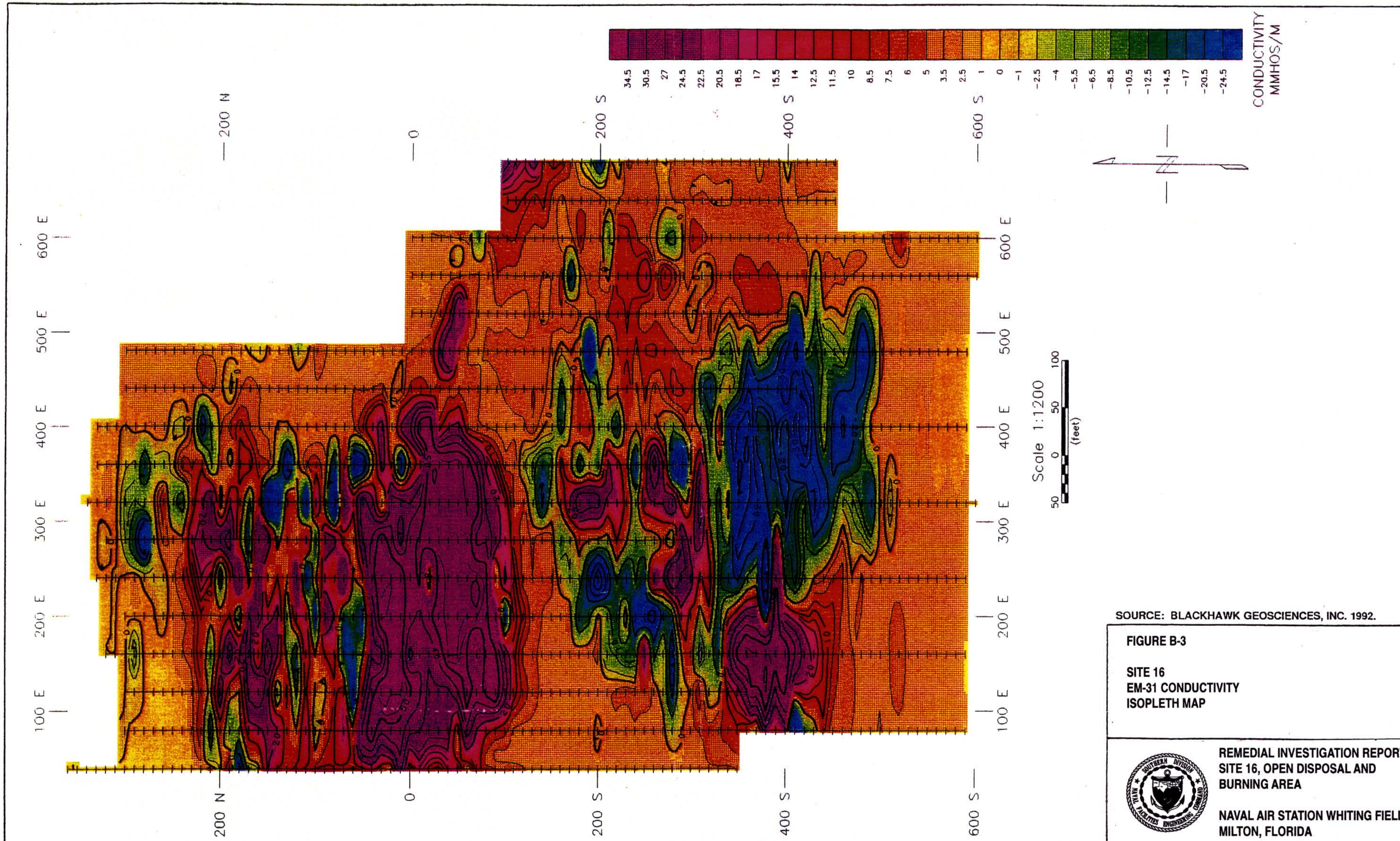
FIGURE B-2

SITE 16
TOTAL MAGNETIC FIELD
ISOPLETH MAP

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND
BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

00248CB7Y



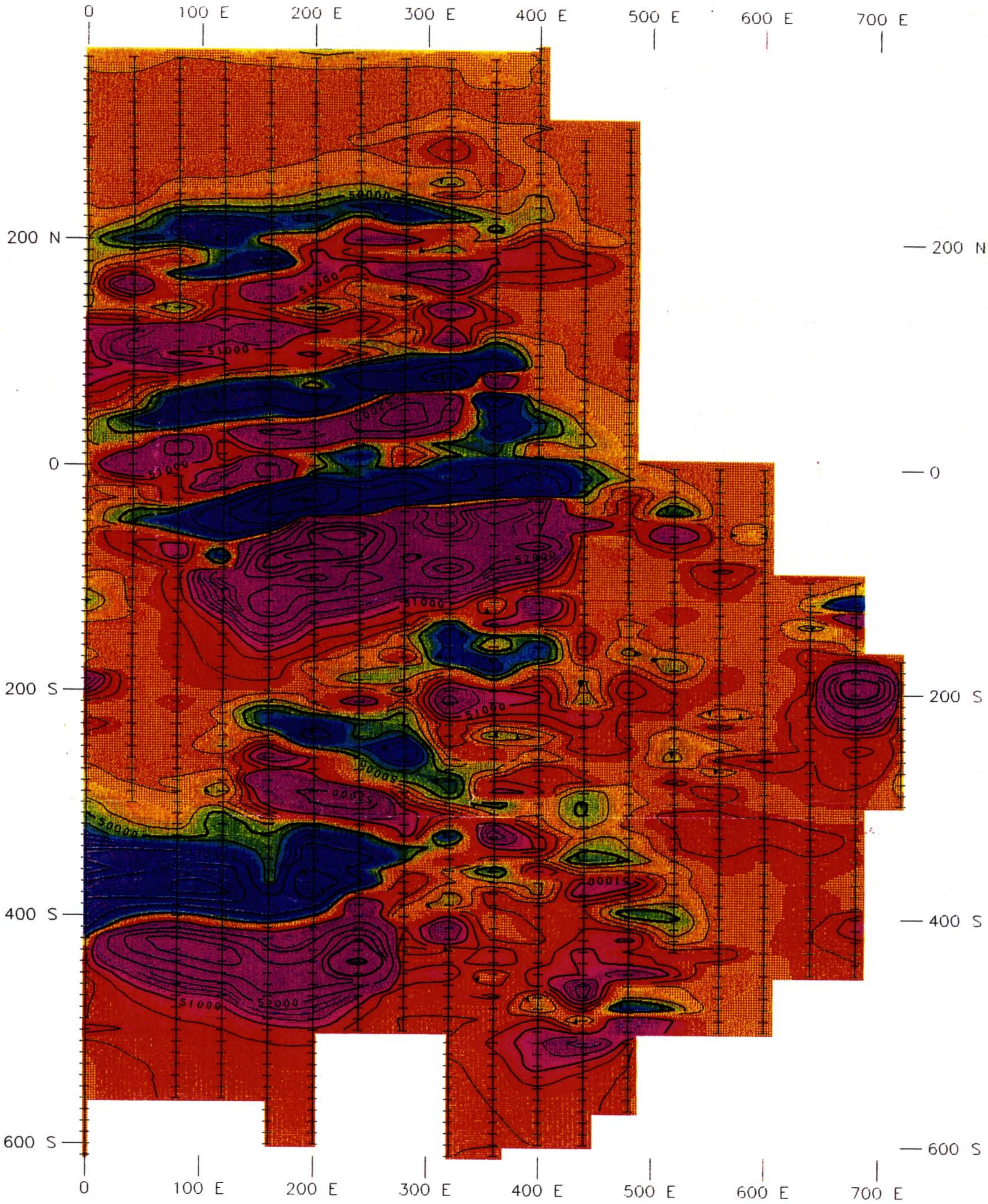
SOURCE: BLACKHAWK GEOSCIENCES, INC. 1992.

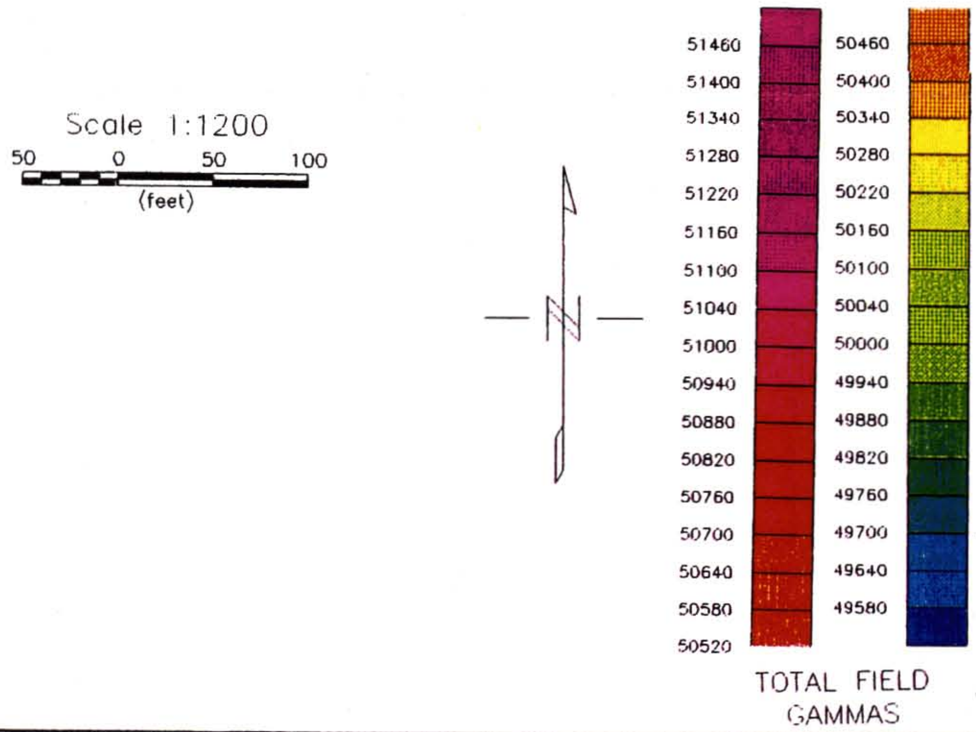
FIGURE B-3

SITE 16
EM-31 CONDUCTIVITY
ISOPLETH MAP

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND
BURNING AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA





SOURCE: BLACKHAWK GEOSCIENCES, INC. 1992.

FIGURE B-4

SITE 16
EM-31 INPHASE
ISOPLETH MAP

REMEDIAL INVESTIGATION REPORT
SITE 16, OPEN DISPOSAL AND
BURNING AREA
NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

APPENDIX C

MONITORING WELL AND TEST PIT LOGS

LITHOLOGIC LOG FOR WELL NUMBER (SITE 15)

Description	Depth (ft)	Thickness (ft)
Clay, red, gray, tan; sand, fine to medium grained..................................	0 - 42.0	42.0
Sand, fine to coarse grained, buff; clay, light gray..................................	42.0 - 65.0	23.0
Sand, fine to coarse grained, buff; gravel, mafics..................................	65.0 - 72.0	7.0

Geraghty & Miller, Verification Study, 1986

TITLE: NAVAL AIR STATION WHITING FIELD	**LOG of WELL:** WHF-15-2D	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM		**PROJECT NO:** RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	**DATE STARTED:** 07/17/93	**COMPLTD:** 07/18/93
METHOD: MUD ROTARY / **CASE SIZE:** 2 in.	**SCREEN INT.:** 104.6-109.6 FT	**PROTECTION LEVEL:** D
TOC ELEV.: 60.07 FT. / **MONITOR INST.:** OVA	**TOT DPTH:** 110FT.	**DPTH TO ▽** 19.33 FT.
LOGGED BY: N. Roka	**WELL DEVELOPMENT DATE:**	**SITE:** 15 - S.W. Landfill

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5			24/24	BKG	SAND - rust brown, fine to medium, poorly graded, loose, slightly moist, subrounded.		SP	2,3,4,5	
10			22/24	2	Same as above. CLAY - brown, soft, plastic, moist. SILT SAND - black, fine, loose, slightly moist.		SM	1,1,2,1	
15			24/24	BKG	CLAYEY SAND - gray, fine, poorly graded, loose, slightly moist.		SC	2,2,2,2	
20			24/24	0.4	SAND - white, fine, silt, poorly graded, medium dense, moist.		SP/SM	11,13,17,13	▽
25			24/12	BKG	SANDY SILT - brown, saturated. SAND - yellowish tan, fine to medium, poorly graded, saturated.		SM/SP	WOR,6,4	
30					FROM WHF-15-MW-2I SAND - orange to red to white, coarse, well graded. SAND - orangish brown, fine, poorly graded.		SW		
35					SAND - light tan, fine to medium, poorly graded, saturated.		SP		
40							SP		

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	**LOG of WELL:** WHF-15-2D	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM		**PROJECT NO:** RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	**DATE STARTED:** 07/17/93	**COMPLTD:** 07/18/93
METHOD: MUD ROTARY	**CASE SIZE:** 2 in.	**SCREEN INT.:** 104.6-109.6 F
PROTECTION LEVEL: D	**TOC ELEV.:** 60.07 FT.	**MONITOR INST.:** OVA
TOT DPTH: 110FT.	**DPTH TO ∇** 19.33 FT.	
LOGGED BY: N. Roka	**WELL DEVELOPMENT DATE:**	**SITE:** 15 - S.W. Landfill

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	SOIL CLASS	BLOWS/6-IN
					SAND - gray, fine, silty, well graded, saturated.	SP	
45					SAND - gray, fine to medium, trace coarse, poorly graded, saturated.	SP	
50					SAND - light brown, medium, well graded, saturated.	SP	
55					SAND - light tan, fine, poorly graded, saturated. RESUME WHF-15-MW-2D	SP	
60			24/24	1.6	SAND - light tan, fine to medium, poorly graded, medium dense, saturated, subangular.	SP	13,11,10,12
65			24/24	BKG	Same as above, loose.	SP	4,5,5,9
70			12/24	1.2	Same as above, medium dense.	SP	4,8,9,11
75			24/24	8	Same as above, dense.	SP	10,18,28,42
80				2.6		SP	4,4,8,11

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-15-2D		BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 07/17/93	COMPLTD: 07/18/93
METHOD: MUD ROTARY	CASE SIZE: 2 in.	SCREEN INT.: 104.6-109.6 FT	PROTECTION LEVEL: D
TOC ELEV.: 60.07 FT.	MONITOR INST.: OVA	TOT DPTH: 110FT.	DPTH TO ▽ 19.33 FT.
LOGGED BY: N. Roka	WELL DEVELOPMENT DATE:		SITE: 15 - S.W. Landfill

Continued from PAGE 2

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			10/24		Same as above, medium dense.		SP		
85			24/24	10	same as above, dense.		SP	48,22,23,20	
90			0/24	BKG	NO RECOVERY			6,8,15,22	
95			24/24	3	Same as above, medium dense.		SP	4,6,8,12	
100			12/24	21	Same as above, dense.		SP	10,15,22,29	
105			24/24	5	Same as above, loose.		SP	3,4,5,8	
110									
115									
120									

TITLE: NAVAL AIR STATION WHITING FIELD	**LOG of WELL:** WHF-15-2S	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM		**PROJECT NO:** RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	**DATE STARTED:** 02/4/93	**COMPLTD:** 02/4/93
METHOD: HSA	**CASE SIZE:** 2	**SCREEN INT.:** 15-30 FT
PROTECTION LEVEL: D	**TOC ELEV.:** 80.18 FT.	**MONITOR INST.:** OVA
TOT DPTH: 37FT.	**DPTH TO ▽** 19.34 FT.	**LOGGED BY:** R.Nelson
WELL DEVELOPMENT DATE:	**SITE:** 15 - S.W. Landfill	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN
5					SEE WHF-15-2D FOR ADDITIONAL LITHOLOGICAL DESCRIPTIONS.			
10								
15			18/24	1	CLAY - gray, firm, moist, some sand.		SC	2,2,2,4
20			12/24	1	CLAYEY SAND - gray, firm, moist.		SC	2,7,10,10
25			20/24		SAND - gray, fine, poorly graded, saturated.		SP	3,4,4,4
30								
35								
40								

WELL DATA

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-15-3D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA

CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 01/23/93	COMPLTD: 01/25/93
METHOD: MUD ROTARY	CASE SIZE: 2	SCREEN INT.: 108-118 FT.	PROTECTION LEVEL: D
TOC ELEV.: 69.61 FT.	MONITOR INST.: OVA	TOT DPTH: 119FT.	DPTH TO ▽ 26.2 FT.
LOGGED BY: R. Nelson	WELL DEVELOPMENT DATE:		SITE: 15 - S.W. Landfill

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5									
			14/24	0	SANDEY CLAY - red, moist.		SC/CL	2,3,3,4	
10									
			08/24	0	SAND - red, fine, poorly graded, trace clay, slightly moist.		SP	5,5,8,10	
15									
			09/24	3	SAND - SAA.		SP	6,8,8,12	
20									
			07/24	1	SAND/GRAVEL - red, well graded, slightly moist.		GW	10,8,10,11	
25									
			12/24	1000	SAND (3") - reddish brown, fine, poorly graded CLAY (3") - purple, very fine, poorly graded. SAND (9") - yellow to tan, coarse, poorly graded, strong odor.		SP	2,3,3,4	▽
30									
			24/24	4	SAND (1.5') - reddish brown, very fine, poorly graded, saturated. SAND (6") - white to purple, medium to coarse, well graded, saturated.		SP	3,3,3,3	
35									
			12/24	2	SAND - light purple, fine to medium, poorly graded, saturated, sub-rounded.		SP	6,7,8,8	
40									

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-15-3D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 01/23/93	COMPLTD: 01/25/93

METHOD: MUD ROTARY	CASE SIZE: 2	SCREEN INT.: 108-118 FT.	PROTECTION LEVEL: D
TOC ELEV.: 69.61 FT.	MONITOR INST.: OVA	TOT DPTH: 119FT.	DPTH TO ⊻ 26.2 FT.
LOGGED BY: R. Nelson	WELL DEVELOPMENT DATE:		SITE: 15 - S.W. Landfill

Continued from PAGE 1

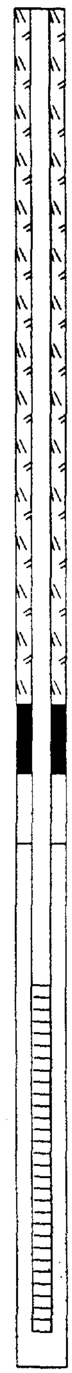
DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			16/24	6	SAND - SAA, 1" bands of red fine sand at top and bottom of spoon.		SP	6,6,7,9	
45									
			12/24	5	SAND (8") - orange to brown, medium, well graded, trace coarse, saturated. SAND (4") - yellowish, medium, well graded.		SW	7,8,5,6	
50									
			14/24	4	SAND (10") - white, medium, well graded, trace coarse, saturated. SAND (4") - purple, SAA.		SW	6,5,5,4	
55									
			18/24	1	SAND - white to tan, very fine, poorly graded, saturated.		SP	3,2,5,6	
60									
			12/24	1	SAND - yellow to brown, fine, poorly graded, trace coarse, saturated.		SP	8,11,?,11	
65									
			18/24	N/A	SAND - fine, poorly graded, saturated.		SP	12,16,16,16	
70									
			12/24	20	SAND - yellow to brown, medium, poorly graded, saturated, sub-rounded.		sp	3,4,3,6	
75									
			16/24	10	SAND - yellow to brown, medium, well graded, saturated, sub-rounded.		SP	11,12,16,23	
80									

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-15-3D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA

CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 01/23/93	COMPLTD: 01/25/93
METHOD: MUD ROTARY	CASE SIZE: 2	SCREEN INT.: 108-118 FT.	PROTECTION LEVEL: D
TOC ELEV.: 69.61 FT.	MONITOR INST.: OVA	TOT DPTH: 119FT.	DPTH TO ▽ 26.2 FT.
LOGGED BY: R. Nelson	WELL DEVELOPMENT DATE:		SITE: 15 - S.W. Landfill

Continued from PAGE 2

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			12/24	40	SAND - yellow to brown, medium, poorly graded, saturated, 2" lamina of purple sand, fine at 83'.		SP	17,21,23,21	
85			14/24	2	SAND - yellow brown, fine, well graded, saturated, 4" lamina of purple, medium sand at 86'.		SP	N/A	
90			20/24	0	CLAY (16") - purple to yellow, firm, plastic, saturated. SAND (4") - yellow brown, fine, poorly graded, trace clay, saturated.		CH	N/A	
95			18/24	0	SAND - yellow brown, very fine, poorly graded, trace silt, moist.		SM	N/A	
100			18/24	1	SAND - SAA.		SM	N/A	
105			14/24	0	SAND (4") - yellow to brown, fine, saturated. CLAY (4") - purple to yellow, plastic, saturated. SAND (6") - purple to yellow-brown, fine.		SP	N/A	
110			14/24	5	SAND - yellow to brown, fine to coarse, saturated.		SP	N/A	
115			20/24	5	SAND - purple, medium, poorly graded, saturated, sub-rounded.		SP	N/A	
			20/24	N/A	SAND (10") - SAA. CLAY (10") - purple, stiff, fine yellow sand interbedded.		SP	N/A	
120									



TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-15-3I	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 02/2/93	COMPLTD: 02/2/93
METHOD: MUD ROTARY	CASE SIZE: 2	SCREEN INT.: 75-85 FT
PROTECTION LEVEL: D		
TOC ELEV.: 69.72 FT.	MONITOR INST.: OVA	TOT DPTH: 87FT.
DPTH TO ∇ 26.86 FT.		
LOGGED BY: G. Kanchibhatla	WELL DEVELOPMENT DATE:	SITE: 15 - S.W. Landfill

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5					SEE WHF-15-3D FOR LITHOLOGICAL DESCRIPTIONS.				
10									
15									
20									
25									∇
30									
35									
40									
45									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-15-3I		BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 02/2/93	COMPLTD: 02/2/93
METHOD: MUD ROTARY	CASE SIZE: 2	SCREEN INT.: 75-85 FT	PROTECTION LEVEL: D
TOC ELEV.: 69.72 FT.	MONITOR INST.: OVA	TOT DPTH: 87FT.	DPTH TO ∇ 26.86 FT.
LOGGED BY: G. Kanchibhatla	WELL DEVELOPMENT DATE:		SITE: 15 - S.W. Landfill

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
50									
55									
60									
65									
70									
75					SAND - purple, fine, poorly graded, saturated.		SP	2,3,2,2	
					SAND - purple, medium, well graded, saturated.				
80					SAND - light purple, fine, silty, poorly graded, saturated.		SP	5,8,9,12	
85									
90									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	**LOG of WELL:** WHF-15-3S	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM		**PROJECT NO:** RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	**DATE STARTED:** 02/1/93	**COMPLTD:** 02/1/93
METHOD: HSA / **CASE SIZE:** 2"	**SCREEN INT.:** 20-35 FT	**PROTECTION LEVEL:** D
TOC ELEV.: 69.87 FT. / **MONITOR INST.:** OVA	**TOT DPTH:** 37FT.	**DPTH TO ▽** 26.24 FT.
LOGGED BY: G. Kanchibhatla / **WELL DEVELOPMENT DATE:**		**SITE:** 15 - S.W. Landfill

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
15					SAND - reddish brown, fine to medium, poorly graded, dry.		SP	5,6,6,6	
20					Same as above, alternating bands of pink and white.		SP	3,4,4,5	
25					SAND - gray to white, medium, poorly graded, saturated.		SP	3,2,2,3	▽
					SAND - fine, silty, saturated.				

Depth scale: 5, 10, 15, 20, 25, 30, 35, 40

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-15-4		BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 02/18/93	COMPLTD: 04/29/93
METHOD: HSA	CASE SIZE: 2"	SCREEN INT.: 92-107 FT.	PROTECTION LEVEL: D
TOC ELEV.: 143.54 FT.	MONITOR INST.: OVA	TOT DPTH: 112FT.	DPTH TO ∇ 98.8 FT.
LOGGED BY: G. Kanchibhatla	WELL DEVELOPMENT DATE:		SITE: 15 - S.W. Landfill

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5			20/24	< 1	SAND - dark brown, fine, poorly graded, dry, loose, some organic content.		SP	1,1,1,1	
10			8/24	0	SAND - reddish brown, fine, poorly graded, dry, loose.		SP	2,2,3,2	
15			1/24	0	SAND - dark tan and yellowish orange bands, fine, poorly graded, dry.		SP	6,8,9,10	
			6/24						
20			24/24	0	Same as above, trace amounts of silt at 21 ft. bls.		SP	4,6,10,12	
25			20/24	0	SAND - white, very fine, poorly graded, moderately dense, dry.		SP	8,7,11,14	
30			20/24	0	SAND - very fine to fine, poorly graded, moderately dense, trace amounts of coarse to very coarse sand.		SP	8,7,11,14	
35			12/24	0	SAND - white with bands of reddish brown fine to medium, poorly graded, loose, dry.		SP	5,6,10,13	
40							SP		

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-15-4	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 02/18/93	COMPLTD: 04/29/93
METHOD: HSA	CASE SIZE: 2"	SCREEN INT.: 92-107 FT.	PROTECTION LEVEL: D
TOC ELEV.: 143.54 FT.	MONITOR INST.: OVA	TOT DPTH: 112FT.	DPTH TO ∇ 98.8 FT.
LOGGED BY: G. Kanchibhatla	WELL DEVELOPMENT DATE:		SITE: 15 - S.W. Landfill

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			20/24	0	Same as above, trace coarse.		SP	5,8,11,14	
45			24/24	0	Same as above.		SP	8,13,23,27	
50			20/24	0	SAND - white, fine, trace silt, moderately dense, slightly moist, poorly graded.		SP	6,11,15,17	
55			20/24	0	Same as above.		SP	14,10,14,21	
60			20/24	0	Same as above, white to tan.		SP	10,15,21,29	
65			18/24	0	SAND - white to tan, fine to medium, fairly graded, moderately dense, slightly moist.		SP	22,28,29,28	
70			18/24	0	SAND - white, very fine to fine, poorly graded, moderately dense, dry.		SP	17,11,25,52	
75			18/24	1	SAND - white, very fine to fine, purple bands, poorly graded, loose, dry.		SP	18,27,31,28	
80							SP		

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-15-4	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 02/18/93	COMPLTD: 04/29/93
METHOD: HSA	CASE SIZE: 2"	SCREEN INT.: 92-107 FT.
PROTECTION LEVEL: D		
TOC ELEV.: 143.54 FT.	MONITOR INST.: OVA	TOT DPTH: 112FT.
DPTH TO ▽ 98.8 FT.		
LOGGED BY: G. Kanchibhatla	WELL DEVELOPMENT DATE:	SITE: 15 - S.W. Landfill

Continued from PAGE 2

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			20/24	0	SAND - white to purple, medium to fine, some coarse, poorly graded, moderately dense, slightly moist, trace silt.		SP	22,12,12,14	
85			16/24	0	SAND - white to tan and purple, very fine to fine, poorly graded, dry, moderately dense.		SP	16,31,39,29	
90			18/24	0	SAND - white to tan, fine, poorly graded with some silt, loose to moderate density, slightly moist.		SP	22,22,42,27	
95			20/24	0	SAND - white to tan, very fine to fine, some silt, poorly graded top 8", over SANDY CLAY, yellow orange to purple, moist 8", over SAND, very fine to fine, purple, slightly moist, dense.		SP	7,15,31,33	
100			16/24	-	SAND - white to tan, fine, poorly graded, saturated, trace sandy clay.		SP	DROP,16,15	
				-					
105			24/24	-	Same as above, trace silt, saturated to wet.		SP		
110			24/24	-	Same as above, fine, light brown.		SP		
115					WHF-15-4 WAS REDRILLED ON 4/29/93.				
120									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-15-5	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 02/05/93	COMPLTD: 02/08/93
METHOD: Mud Rot	CASE SIZE: 6 in.	SCREEN INT.: 56-66 FT.
PROTECTION LEVEL: D		
TOC ELEV.: 104.32 FT.	MONITOR INST.: OVA	TOT DPTH: 68FT.
DPTH TO ▽ 64.63 FT.		
LOGGED BY: N. Haglin	WELL DEVELOPMENT DATE:	SITE: 15 - S.W. Landfill

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5			15/24	0	SILTY SAND - dark red, fine, medium dense, damp.		SM	3,5,5,7	
10			24/24	0	Same as above.		SM	-,-,-,-	
15			12/24	0	SAND - reddish tan to white, fine, loose, dry.		SP	2,5,8,11	
20			24/24	0	Same as above, more white sand.		SP	4,5,7,10	
25			24/24	0	SAND - white, very fine to fine, loose, dry.		SP	5,5,6,7	
30			20/24	0	Same As Above, banded dark red and white.		SP	5,11,12,15	
35			15/24	0	SAND - fine, banded rust and white, damp.		SP	6,9,12,12	
40							SP		

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-15-5	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 02/05/93	COMPLTD: 02/08/93
METHOD: Mud Rot	CASE SIZE: 6 in.	SCREEN INT.: 56-66 FT. / PROTECTION LEVEL: D
TOC ELEV.: 104.32 FT.	MONITOR INST.: OVA	TOT DPTH: 68FT. / DPTH TO ∇ 64.63 FT.
LOGGED BY: N. Haglin	WELL DEVELOPMENT DATE:	SITE: 15 - S.W. Landfill

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			14/24	0	SAND - white, some pink, fine, trace coarse sand, loose, damp.		SP	3,7,8,7	
45			24/24	0	SAND - purple, fine to medium, some coarse sand, loose, wet.		SW	4,3,3,5	
			24/24	0	CLAY - purple, grey, tan, and yellow, fine sand lenses, firm, plastic, moist.		CL	2,3,2,4	
50			24/24	0	CLAY - Grey, highly plastic, firm, traces of purple very fine sand and yellow silt.		CL	1,2,3,6	
			24/24	0	CLAY - Grey mottled red, some sandy lenses, plastic, firm.			1,1,4,5	
55			24/24	0	Same As Above top 18" over SAND, white, very fine, some silt, dry.		SP	10,12,14,18	
			24/24	0	SILTY SAND - brown, medium, wet, over very fine sand, white, damp (bottom 6").		SM	18,30,36,46	
60			24/24	0	SAND - Top 8" brown, medium, wet, over 8" of sandy clay, brown, wet, over 8" of sand, white, very fine, damp.		SP	12,14,10,12	
65			14/24	< 1	SAND - brown to white, fine to medium, some clayey sand, loose, wet.		SP	14,14,11,10	∇
70									
75									
80									

TITLE: NAVAL AIR STATION WHITING FIELD		LOG of WELL: WHF-15-6D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 02/5/93	COMPLTD: 02/8/93
METHOD: MUD ROTARY	CASE SIZE: 2"	SCREEN INT.: 110-120 FT.	PROTECTION LEVEL: D
TOC ELEV.: 75.14 FT.	MONITOR INST.: OVA	TOT DPTH: 122FT.	DPTH TO ∇ 35.33 FT.
LOGGED BY: R.Nelson	WELL DEVELOPMENT DATE:		SITE: 15 - S.W. Landfill

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5			16/24	0	SANDY SILT - reddish brown, medium, poorly graded, slightly moist.		SM	3,3,3,3	
10			20/24	1	Same as above.		SM	3,3,3,5	
15			18/24	1	SAND - reddish brown, fine, trace silt, poorly graded, saturated.		SP	7,11,12,15	
					SAND - white to gray, fine, poorly graded.				
20			14/24	1	SAND - reddish brown, fine, poorly graded, trace silt, wet.		SP	5,9,10,12	
25			18/24	120	SAND - light purple, fine, poorly graded, silt, wet.		SP	5,8,8,7	
30			14/24	160	SAND - orangish brown to gray, fine, trace silt, poorly graded.		SP	4,5,5,6	
35			8/24	3	SAND - tan, fine, poorly graded, silty.		SP	PUSHED	∇
40			10/24	160	SAND - gray, fine, poorly graded, wet.		SP	PUSHED	
45									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-15-6D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 02/5/93	COMPLTD: 02/8/93
METHOD: MUD ROTARY	CASE SIZE: 2"	SCREEN INT.: 110-120 FT.	PROTECTION LEVEL: D
TOC ELEV.: 75.14 FT.	MONITOR INST.: OVA	TOT DPTH: 122FT.	DPTH TO ▽ 35.33 FT.
LOGGED BY: R.Nelson	WELL DEVELOPMENT DATE:	SITE: 15 - S.W. Landfill

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			6/24	22	Same as above.		SP	PUSHED	
50			4/24	2	Same as above, medium.		SP	PUSHED	
55			20/24	12	SAND - light tan, fine to medium, poorly graded, wet, trace coarse		SP	7,14,21,18	
60			12/24	5	SAND - purple, fine, poorly graded, wet.		SP	7,9,9,10	
65			20/24	1	SAND - light brown to light purple, medium to coarse, poorly graded, wet.		SP	11,13,8,10	
70			12/24	1	SAND - light brown, medium to coarse, wet. SAND - gray to white, fine, poorly graded.		SP	8,7,4,6	
75			18/24	0	SAND - light brown, medium to coarse, well graded, wet.		SP	10,7,6,7	
80			14/24	1.5	SAND - light brown, medium grained, well graded, wet.		SW	7,7,8,5	
85			14/24	18	Same as above, 3 in. clay layer, medium sand, light purple, poorly graded.		SW	5,6,11,11	
90									

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-15-6D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 02/5/93	COMPLTD: 02/8/93
METHOD: MUD ROTARY	CASE SIZE: 2"	SCREEN INT.: 110-120 FT.
PROTECTION LEVEL: D		
TOC ELEV.: 75.14 FT.	MONITOR INST.: OVA	TOT DPTH: 122FT.
DPTH TO ▽ 35.33 FT.		
LOGGED BY: R.Nelson	WELL DEVELOPMENT DATE:	SITE: 15 - S.W. Landfill

Continued from PAGE 2

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			14/24	1.5	SAND - light brown to purple, medium, well graded.		SW	2,7,8,9	
95			24/24	2.5	SAND - light brown, medium, well graded, wet. Same as above, fine.		SW	3,4,8,11	
100			14/24	4	SAND - light brown, fine, poorly graded, wet.		SP	25,15,15,14	
105			12/24	7	SAND - light brown to light purple, medium, poorly graded.		SP	21,16,18,19	
110			12/24	0	SAND - light brown, fine, poorly graded, wet.		SP	30,37,34,38	
115			12/24	1	SAND - light brown, fine to medium, poorly graded. Same as above, medium. Same as above, purple.		SP	21,20,18,19	
120									
125									
130									
135									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-15-6S	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 02/8/93	COMPLTD: 02/8/93
METHOD: HSA	CASE SIZE: 2"	SCREEN INT.: 25-40 FT.	PROTECTION LEVEL: D
TOC ELEV.: 74.35 FT.	MONITOR INST.: OVA	TOT DPTH: 41FT.	DPTH TO ▽ 34.32 FT.
LOGGED BY: R. Nelson	WELL DEVELOPMENT DATE:		SITE: 15 - S.W. Landfill

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5					SEE WHF-15-6D FOR LITHOLOGIC DESCRIPTIONS.				
10									
15									
20									
25									
30									
35									
40									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Whiting Field	LOG of WELL: WHF-15-7S	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 04/10/96	COMPLTD: 04/11/96
METHOD: Hollow Stem Auger	CASE SIZE: 2 inches	SCREEN INT.: 15 feet
PROTECTION LEVEL: D		
TOC ELEV.: 120.18 FT.	MONITOR INST.: FID	TOT DPTH: 86FT.
DPTH TO ∇ 67.5 FT.		
LOGGED BY: F. Risk	WELL DEVELOPMENT DATE: 04/10/96	SITE: 15

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	SOIL CLASS	BLOWS/6-IN
1					FINE SANDY SILT: Yellowish orange, moist, with some plant matter organics.	ML	
3					CLAY: Dark brown, some silt, low plasticity, moist.	CL	
4					CLAY: Moderate reddish brown, some silt, little sand, nonplastic, moist.		
5				0			
10					SILTY CLAY: With minor percentage of sand, soft, non-plastic, moist, increasing sand with depth reddish brown.		
12				0			
15					SANDY SILT: Light yellow, fine sand, moist.	SM	
20					SANDY SILT: Light yellow, increasing fine sand with depth moist.		
25–27		I	22/24				
30					SILTY FINE SAND: Light yellow, increasing fine sand with depth moist.		
40					SANDY SILT: Pale yellowish orange, moist.	ML	
42				1			
50					SILTY FINE SAND: Pale yellowish orange, some silt, moist.	SM	
55					Fine to medium SAND: Pale yellowish orange, some coarse sand, moist.	SW	
58				3			

TITLE: NAS Whiting Field	LOG of WELL: WHF-15-7S		BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.		DATE STARTED: 04/10/96	COMPLTD: 04/11/96
METHOD: Hollow Stem Auger	CASE SIZE: 2 inches	SCREEN INT.: 15 feet	PROTECTION LEVEL: D
TOC ELEV.: 120.18 FT.	MONITOR INST.: FID	TOT DPTH: 86FT.	DPTH TO ∇ 67.5 FT.
LOGGED BY: F. Risk	WELL DEVELOPMENT DATE: 04/10/96		SITE: 15

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
61					MEDIUM SAND: Pale yellowish orange, some fine sand, moist.		SW		
65				0	FINE SAND: Pale yellowish orange, some medium sand, moist.				
66							SP		
67.5									∇
70					FINE SAND: Light brown, some medium and coarse sand, moist.				
75					Same as above.				
77				1					
80					MEDIUM SAND: Some fine sand, moist, light brown.				
84		I			SILTY CLAY: 1 to 13 inches, stiff, moist, moderate reddish brown.		CL		
86					SANDY SILT: 13 to 15 inches, some sand, moist, gray to purple.		SW	9,18,20,19	
87					15 to 24 inches, medium to coarse SAND, pale yellowish orange.				
88					END OF BORING AT 88 FEET BELOW LAND SURFACE.				

TITLE: NAS Whiting Field	LOG of WELL: WHF-15-7I	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 04/11/96	COMPLTD: 04/13/96
METHOD: ~~OVA~~ Mud Rotary	CASE SIZE: 2 inches	SCREEN INT.: 10 feet	PROTECTION LEVEL: D
TOC ELEV.: 119.85 FT.	MONITOR INST.: FID	TOT DPTH: 117FT.	DPTH TO ∇ FT.
LOGGED BY: F. Risk	WELL DEVELOPMENT DATE: 04/13/96		SITE: 15

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
1					FINE SANDY SILT: Yellowish orange, moist, with some plant matter organics.		SW		
3					CLAY: Dark brown, some silt, low plasticity, moist.				
5					CLAY: Moderate reddish brown, some silt, little sand, nonplastic, moist.				
11					SILTY CLAY: With minor percentage sand soft, nonplastic, moist, increasing sand with depth, reddish brown.				
15					SANDY SILT: Light yellow, fine sand, moist.				
20					SANDY SILT: Light yellow, increasing fine sand with depth, moist.				
30			0		SILTY FINE SAND: Light yellow, increasing fine sand with depth.				
40					SANDY SILT: Pale yellowish orange, moist.				
50					SILTY FINE SAND: Pale yellowish orange, some silt, moist.				
55					Fine to medium SAND: Pale yellowish orange, some coarse sand, moist.				

TITLE: NAS Whiting Field	LOG of WELL: WHF-15-7I	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09

CONTRACTOR: ABB Environmental Services, Inc.		DATE STARTED: 04/11/96	COMPLTD: 04/13/96
METHOD: ~~OVA~~ Mud Rotary	CASE SIZE: 2 inches	SCREEN INT.: 10 feet	PROTECTION LEVEL: D
TOC ELEV.: 119.85 FT.	MONITOR INST.: FID	TOT DPTH: 117FT.	DPTH TO ▽ FT.
LOGGED BY: F. Risk	WELL DEVELOPMENT DATE: 04/13/96		SITE: 15

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
61					Medium SAND: Pale yellowish orange, some fine sand, moist.		SW		
66					FINE SAND: Pale yellowish orange, some medium sand, moist.				
70					FINE SAND: Light brown, some medium and coarse sand moist.				
75					Same as above.				
80					MEDIUM SAND: Some fine sand, moist, light brown.				
84			0		1-13 inches: SILTY CLAY, stiff, moist, moderate reddish brown.				
86					13-15 inches: SANDY SILT, some sand, moist, gray to purple.				
88					15-24 inches: Medium to coarse sand, pale yellowish orange.				
109			60/2	5	Fine to medium SILTY SAND: Pale yellowish orange, some silt minor percent gravel, wet.			17,17,34,30	
111				1	GRAVELY SILT: Pale purple, minor percent clay, dense, wet.		ML		

TITLE: NAS Whiting Field	LOG of WELL: WHF-15-7D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 04/12/96	COMPLTD: 04/13/96
METHOD: Mud Rotary	CASE SIZE: 2 inches	SCREEN INT.: 10 feet	PROTECTION LEVEL: D
TOC ELEV.: 119.49 FT.	MONITOR INST.: FID	TOT DPTH: 146FT.	DPTH TO ∇ FT.
LOGGED BY: F. Risk	WELL DEVELOPMENT DATE: 4/13/96		SITE: 15

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
1					FINE SANDY SILT: Yellowish orange, moist, with some plant matter organics.		SW		
3					CLAY: Dark brown, some silt, low plasticity, moist.				
5					CLAY: Moderate reddish brown, some silt, little sand, nonplastic, moist.				
10					SILTY CLAY: With minor percentage sand, soft, non-plastic, increasing sand with depth.				
15					SANDY SILT: Light yellow fine sand, moist.				
20					SANDY SILT: Light yellow, increasing fine sand with depth, moist.				
30			0						
31					SILTY FINE SAND: Light yellow, increasing fine SAND with depth.				
40					SANDY SILT: Pale yellowish orange, moist.				
50					SILTY FINE SAND: Pale yellowish orange, some silt, moist.				
55					Fine to medium SAND: Pale yellowish orange, some coarse sand moist.				
60									

TITLE: NAS Whiting Field	LOG of WELL: WHF-15-7D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 04/12/96	COMPLTD: 04/13/96
METHOD: Mud Rotary	CASE SIZE: 2 inches	SCREEN INT.: 10 feet	PROTECTION LEVEL: D
TOC ELEV.: 119.49 FT.	MONITOR INST.: FID	TOT DPTH: 146FT.	DPTH TO ∇ FT.
LOGGED BY: F. Risk	WELL DEVELOPMENT DATE: 4/13/96	SITE: 15

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
61					MEDIUM SAND: Pale yellowish orange, some fine sand, moist.		SW		
65					FINE SAND: Pale yellowish orange, some medium sand, moist.				
70					FINE SAND: Light brown, some medium coarse sand moist.				
75					Same as above.				
80					MEDIUM SAND: Some fine sand, moist, light brown.				
84			0		1-13 inches: SILTY CLAY, stiff, moist, moderate reddish brown.				
86					13-15 inches: SANDY SILT, some sand, moist, gray to purple.				
88					15-24 inches: Medium to coarse SAND, pale yellowish orange.				
110			60/2						
120									

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TITLE: NAS Whiting Field	LOG of WELL: WHF-15-7D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 04/12/96	COMPLTD: 04/13/96
METHOD: Mud Rotary	CASE SIZE: 2 inches	SCREEN INT.: 10 feet
PROTECTION LEVEL: D		
TOC ELEV.: 119.49 FT.	MONITOR INST.: FID	TOT DPTH: 146FT.
DPTH TO ∇ FT.		
LOGGED BY: F. Risk	WELL DEVELOPMENT DATE: 4/13/96	SITE: 15

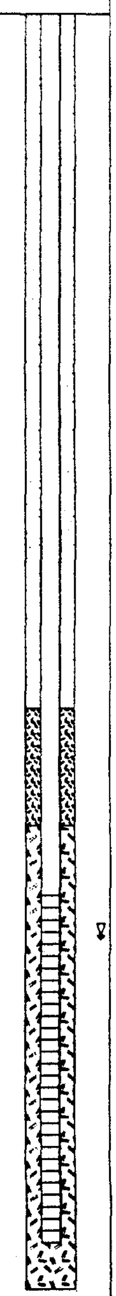
Continued from PAGE 2

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
121							SW		
138					Gravely MEDIUM SAND: Yellowish orange, some silt gravel, little silt, trace clay, very dense, wet.				
140				1				1,26,31 refusal	
141					Gravely medium SAND: Light yellowish orange, some gravel, very dense, wet.				
143					SILT: Pale yellow orange, some sand, little clay, hard, moist.		ML		
144							SW		
145					SAND: Light yellowish orange, some gravel, dense, wet.				
146					END OF BORING AT 145.5 FEET BELOW LAND SURFACE.				

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Whiting Field	LOG of WELL: WHF-15-8S	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 05/23/96	COMPLTD: 05/23/96
METHOD: Mud Rotary	CASE SIZE: 2 inches	SCREEN INT.: 15 feet
PROTECTION LEVEL: D	TOC ELEV.: 80.0 FT.	MONITOR INST.: FID
TOT DPTH: 55FT.	DPTH TO ▽ 39.7 FT.	
LOGGED BY: F. Risk	WELL DEVELOPMENT DATE: 05/23/96	SITE: 15

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
1					FINE SAND and SILT: Yellowish brown, loose, moist.		SM		
5					FINE SAND: Reddish brown, moist.		SP		
15					MEDIUM SAND: Reddish brown, poorly sorted, moist.				
25					FINE SAND: Light brown, well sorted, moist.		SM		



TITLE: NAS Whiting Field	LOG of WELL: WHF-15-8I	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 05/10/96	COMPLTD: 05/10/96
METHOD: Mud Rotary	CASE SIZE: 2 inches	SCREEN INT.: 10 feet
PROTECTION LEVEL: D	TOC ELEV.: 79.48 FT.	MONITOR INST.: FID
TOT DPTH: 85FT.	DPTH TO ∇ FT.	LOGGED BY: J. Beauchamp
WELL DEVELOPMENT DATE: 5/10/96	SITE: 15	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
1									
2									
3				0					
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26				0					
27									
28									
29									
30									

TITLE: NAS Whiting Field	LOG of WELL: WHF-15-8I	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 05/10/96	COMPLTD: 05/10/96
METHOD: Mud Rotary	CASE SIZE: 2 inches	SCREEN INT.: 10 feet	PROTECTION LEVEL: D
TOC ELEV.: 79.48 FT.	MONITOR INST.: FID	TOT DPTH: 85FT.	DPTH TO ∇ FT.
LOGGED BY: J. Beauchamp	WELL DEVELOPMENT DATE: 5/10/96	SITE: 15

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
31									
32									
33									
34									
35									
36									
37									
38									
39									
40				0					
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55				0					
56									
57									
58									
59									
60									

TITLE: NAS Whiting Field	LOG of WELL: WHF-15-8I	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 05/10/96	COMPLTD: 05/10/96
METHOD: Mud Rotary	CASE SIZE: 2 inches	SCREEN INT.: 10 feet	PROTECTION LEVEL: D
TOC ELEV.: 79.48 FT.	MONITOR INST.: FID	TOT DPTH: 85FT.	DPTH TO ▽ FT.
LOGGED BY: J. Beauchamp	WELL DEVELOPMENT DATE: 5/10/96	SITE: 15

Continued from PAGE 2

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN
70–71				0				
77				0	SAND: Medium grained, some silt, well-graded, light brown, saturated.			
79				0				20,22,34,37
85				0				

TITLE: NAS Whiting Field	LOG of WELL: WHF-15-8D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 06/07/96	COMPLTD: 06/08/96

METHOD: Mud Rotary	CASE SIZE: 2 inches	SCREEN INT.: 10 Feet	PROTECTION LEVEL: D
TOC ELEV.: 79.08 FT.	MONITOR INST.: OVA	TOT DPTH: 115FT.	DPTH TO ∇ FT.
LOGGED BY: F. Risk	WELL DEVELOPMENT DATE: 6/08/96		SITE: 15

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA

TITLE: NAS Whiting Field	LOG of WELL: WHF-15-8D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 06/07/96	COMPLTD: 06/08/96
METHOD: Mud Rotary	CASE SIZE: 2 inches	SCREEN INT.: 10 Feet	PROTECTION LEVEL: D
TOC ELEV.: 79.08 FT.	MONITOR INST.: OVA	TOT DPTH: 115FT.	DPTH TO ▽ FT.
LOGGED BY: F. Risk	WELL DEVELOPMENT DATE: 6/08/96		SITE: 15

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
61–106									
107–109							SW		
110				1	Fine to very coarse SAND yellowish orange poorly sorted, subrounded, wet.			8,11,10,18	
115					END OF BORING @ 115 FEET.				
116–120									

 ABB ENVIRONMENTAL SERVICES, INC.

LITHOLOGIC LOG FOR WELL NUMBER (SITE 16)

Description	Depth (ft)	Thickness (ft)
Sand, fine to medium grained, yellow; clay, yellow....................................	0 - 9.0	9.0
Clay, red, white..........................	9.0 - 15.0	6.0
Sand, fine to coarse grianed, white; gravel....................................	15.0 - 42.0	27.0

Geraghty & Miller, Verification Study, 1986

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-16-2D	BORING NO. WHF-16-2D
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 02/09/93	COMPLTD: 03/4/93
METHOD: MUD ROT. CASE SIZE: N/A	SCREEN INT.: N/A	PROTECTION LEVEL: D
TOC ELEV.: N/A FT. MONITOR INST.: OVA	TOT DPTH: 262FT.	DPTH TO ▽ FT.
LOGGED BY: R. Nelson, G.K. WELL DEVELOPMENT DATE: N/A		SITE: 16 - Wastewater Plnt.

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5			15/24	0	SAND - light brown, fine to medium, poorly graded, dry.		SP	4,4,7,5	
10			12/24	0	SILTY SAND - reddish brown, poorly graded, dry.		SP	4,3,5,4	
15			12/24	2	SILTY SAND - reddish brown, poorly graded, trace coarse, dry.		SP	6,8,12,14	
20			16/24	1	SILTY SAND - SAA.		SP	5,6,7,9	
25			14/24	0	SAND - white to tan, very fine, poorly graded, grade to SANDY CLAY - white, yellow mottling, firm, dry.		SP	6,9,8,5	
30			14/24	0	SAND - off-white, fine, poorly graded, dry.		SP	9,11,12,14	
35			16/24	0	SAND - SAA, saturated.		SP	6,6,7,9	
40				2			SP	4,5,9,16	

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	**LOG of WELL:** WHF-16-2D	**BORING NO.** WHF-16-2D
CLIENT: SOUTHNAVFACENGCOM		**PROJECT NO:** RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	**DATE STARTED:** 02/09/93	**COMPLTD:** 03/4/93

METHOD: MUD ROT.	**CASE SIZE:** N/A	**SCREEN INT.:** N/A	**PROTECTION LEVEL:** D
TOC ELEV.: N/A FT.	**MONITOR INST.:** OVA	**TOT DPTH:** 262FT.	**DPTH TO ▽ FT.**
LOGGED BY: R. Nelson, G.K.	**WELL DEVELOPMENT DATE:** N/A		**SITE:** 16 - Wastewater Plnt.

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			20/24		SAND - light brown, fine, poorly graded, saturated. SAND - white, fine, poorly graded, saturated.		SP		
45			22/24	9	SAND - ligh brown to tan, fine to medium, poorly graded, saturated.		SP	15,16,11,9	
50			20/24	6	SAND - off-white, fine to medium, poorly graded, trace silt, saturated.		SP	6,7,7,11	
55			16/24	10	SAND - off-white to light pink, fine to medium, poorly graded, saturated.		SP	7,8,9,11	
60			16/24	2	SAND - SAA.		SP	16,12,12,14	
65			18/24	7	SAND - purple, medium, poorly graded, trace silt, saturated.		SP	dropped	
70			18/24	11	SAND - off-white, fine, poorly graded, saturated.		SP	13,15,9,6	
75			12/24	26	SAND - light brown, fine, poorly graded, saturated.		SP	13,15,15,15	
80				0			SW	4,5,8,12	

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD		LOG of WELL: WHF-16-2D	BORING NO. WHF-16-2D
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 02/09/93	COMPLTD: 03/4/93
METHOD: MUD ROT.	CASE SIZE: N/A	SCREEN INT.: N/A	PROTECTION LEVEL: D
TOC ELEV.: N/A FT.	MONITOR INST.: OVA	TOT DPTH: 262FT.	DPTH TO ▽ FT.
LOGGED BY: R. Nelson, G.K.	WELL DEVELOPMENT DATE: N/A		SITE: 16 - Wastewater Plnt.

Continued from PAGE 2

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			12/24		SAND - tan to brown, medium, well graded, saturated.		SW		
85			12/24	2.5	SAND - light brown, fine to coarse, poorly graded, saturated.		SP	14,12,16,15	
90			14/24	70	SAND - SAA, purple.		SP	10,14,21,26	
95			14/24	19	SAND - light brown to tan, fine to medium, trace coarse poorly graded.		SP	12,16	
100			16/24	5.5	SAND - SAA, purple.		SP	16,19,22,17	
105			16/24	4	SAND - light brown, fine to medium, poorly graded, saturated.		SP	dropped	
110			18/24	8.5			SP	19,21,26,28	
115			12/24	4	SAND - SAA.		SP	39,41,53,60	
120				N/A			SP	33,42,51,58	

TITLE: NAVAL AIR STATION WHITING FIELD	**LOG of WELL:** WHF-16-2D	**BORING NO.** WHF-16-2D
CLIENT: SOUTHNAVFACENGCOM		**PROJECT NO:** RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	**DATE STARTED:** 02/09/93	**COMPLTD:** 03/4/93
METHOD: MUD ROT. / **CASE SIZE:** N/A	**SCREEN INT.:** N/A	**PROTECTION LEVEL:** D
TOC ELEV.: N/A FT. / **MONITOR INST.:** OVA	**TOT DPTH:** 262FT.	**DPTH TO ∇** FT.
LOGGED BY: R. Nelson, G.K.	**WELL DEVELOPMENT DATE:** N/A	**SITE:** 16 - Wastewater Plnt.

Continued from PAGE 3

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE / RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	SOIL CLASS	BLOWS/6-IN	WELL DATA
		12/24		SAND - light brown with 1" purple lense, medium, poorly graded, saturated.	SP		
125		20/24	N/A	SILTY SAND - fine to medium, poorly graded, soft.	SM	11,11,15,12	
130		24/24	N/A	SILTY SAND - mustard yellow, fine, soft, saturated.	SM	1,2,1,1	
			N/A	SILTY SAND - SAA.	SM	dropped	
135		24/24	N/A	SILTY SAND -SAA, gray.	SM	dropped	
140		24/24	0	SAND - SAA. CLAY - gray, moderately stiff.	CH	7,12,13,14	
		24/24	N/A	CLAY - gray, moderately stiff.		20,18,23,24	
		12/12	0	CLAY - gray, moderately stiff.		9,5,5,7	
145		22/24	0	CLAY (3") - SAA. SANDY SILT - yellowish orange.		9,10,9,8	
		23/24	0	SAND (6") - yellowish orange, fine to coarse, some silt. SANDY CLAY (6") - gray, moderately stiff. CLAY (11") - gray, moderately stiff.		13,12,11,12	
150		22/24	0	CLAY - SAA, high plasticity.		14,14,15,16	
155		24/24	0	CLAY - SAA.	CH	6,7,8,15	
160		24/24	0	CLAY - SAA.	CH	14,12,11,14	

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-16-2D	BORING NO. WHF-16-2D
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 02/09/93	COMPLTD: 03/4/93
METHOD: MUD ROT.	CASE SIZE: N/A	SCREEN INT.: N/A	PROTECTION LEVEL: D
TOC ELEV.: N/A FT.	MONITOR INST.: OVA	TOT DPTH: 262FT.	DPTH TO ▽ FT.
LOGGED BY: R. Nelson, G.K.	WELL DEVELOPMENT DATE: N/A	SITE: 16 - Wastewater Plnt.

Continued from PAGE 4

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			24/24				CH		
165			24/24	0	CLAY - SAA.		CH	12,12,12,16	
170			24/24	0	CLAY - SAA, some fine sand.		CH	11,10,18,24	
175			14/24	0	CLAY (3") - gray, moderately stiff, some sand. SAND (9") - gray, fine to coarse, poorly graded, very dense, saturated.		CH	60,85,refusl	
180			24/24	0	SANDY CLAY - gray, low plasticity.		CL	24,26,22,15	
185			12/24	0	SANDY SILT - olive gray, very fine, poorly graded, moderately dense, moist.		ML	29,41,46,52	
190			12/24	0	SILT (6") - olive green, dense, slightly moist. SAND (3") - light olive gray, very fine, poorly graded, very dense, moist. SANDY SILT (3") - olive gray, dense, moist.		ML	57,59,55,70	
195			08/24	0	SAND - olive gray, fine, poorly graded, very dense, some silt, saturated.		SP	61,refusal	
200			24/24	0	SANDY SILT - olive green to gray, very dense, shell fragments, moist.		ML	60,82,96,ref	

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-16-2D		BORING NO. WHF-16-2D
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 02/09/93	COMPLTD: 03/4/93
METHOD: MUD ROT.	CASE SIZE: N/A	SCREEN INT.: N/A	PROTECTION LEVEL: D
TOC ELEV.: N/A FT.	MONITOR INST.: OVA	TOT DPTH: 262FT.	DPTH TO ▽ FT.
LOGGED BY: R. Nelson, G.K.	WELL DEVELOPMENT DATE: N/A		SITE: 16 - Wastewater Plnt.

Continued from PAGE 5

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			24/24				ML		
205			12/24	0	SANDY SILT - SAA, saturated.		ML	86,75,ref	
210			24/24	0	CLAY - dark gray, stiff, high plasticity, dry.		CH	22,22,24,31	
215			24/24	0	CLAY - SAA.		CH	18,20,29,37	
220			24/24	0	CLAY - SAA.		CH	18,20,28,43	
225									
230			24/24	0	SAND (6") - gray, fine to medium, poorly graded, saturated. CLAY (1.5') - gray, firm, plastic.		CH	33,31,48,ref	
235			24/24	0	CLAY - gray, moderately stiff, plastic.		CH	12,17,22,35	
240									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-16-2D	BORING NO. WHF-16-2D
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 02/09/93	COMPLTD: 03/4/93
METHOD: MUD ROT. / CASE SIZE: N/A	SCREEN INT.: N/A	PROTECTION LEVEL: D
TOC ELEV.: N/A FT. / MONITOR INST.: OVA	TOT DPTH: 262FT.	DPTH TO ▽ FT.
LOGGED BY: R. Nelson, G.K. / WELL DEVELOPMENT DATE: N/A		SITE: 16 - Wastewater Plnt.

Continued from PAGE 6

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
245			24/24	0	CLAY - SAA.		CH	37,40,35,35	
250									
255			24/24	3	SILTY SAND - gray, dense, trace coarse, moist.		SM	52,50,refusl	
260			12/24	N/A	SANDY SILT - gray, fine, poorly graded, shell fragments, saturated.		ML	23,35,53,ref	
265									
270									
275									
280									

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-16-2I	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA

CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 02/18/93	COMPLTD: 02/18/93
METHOD: MUD ROTARY	CASE SIZE: 2"	SCREEN INT.: 117-127 FT	PROTECTION LEVEL: D
TOC ELEV.: 80.71 FT.	MONITOR INST.: OVA	TOT DPTH: 127.5FT.	DPTH TO ▽ 36.52 FT.
LOGGED BY: R. Nelson	WELL DEVELOPMENT DATE:		SITE: 16 - Open Disposal/Burn Area

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5					SEE WHF-16-2D FOR FULL LITHOLOGIC DATA.				
10									
15									
20									
25									
30									
35									▽
40									
45									
50									
55									
60									
65									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-16-2I	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 02/18/93	COMPLTD: 02/18/93
METHOD: MUD ROTARY	CASE SIZE: 2"	SCREEN INT.: 117-127 FT
PROTECTION LEVEL: D		
TOC ELEV.: 80.71 FT.	MONITOR INST.: OVA	TOT DPTH: 127.5FT.
DPTH TO ∇ 36.52 FT.		
LOGGED BY: R. Nelson	WELL DEVELOPMENT DATE:	SITE: 16 - Open Disposal/Burn Area

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
115			06/24	N/A	SAND - ligh brown, medium, poorly graded, saturated, purple lamina.		SP	12,18,18,37	
120			08/24	N/A	SAND - SAA.		SP	38,30,60,48	
125			16/24	N/A	SAND - tan, medium, poorly graded, trace gravel, saturated, rounded.		SP	20,20,20,24	

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	**LOG of WELL:** WHF-16-3D	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM		**PROJECT NO:** RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	**DATE STARTED:** 01/22/93	**COMPLTD:** 01/26/93
METHOD: MUD ROTARY	**CASE SIZE:** 2"	**SCREEN INT.:** 105-115 FT
PROTECTION LEVEL: D	**TOC ELEV.:** 51.47 FT.	**MONITOR INST.:** OVA
TOT DPTH: 115FT.	**DPTH TO ∇** 10.32 FT.	**LOGGED BY:** W. Colby-George
WELL DEVELOPMENT DATE:	**SITE:** 16 - S.W. Landfill	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5					SAND - light brown, well sorted.		SP		
10					SAND - some fines, wet.		SP		∇
15					SAND - red brown.		SP		
20					SAND - SAA		SP		
25					SAND - yellow to tan.		SP		
30					SAND - yellow to purple, fine.		SP		
35					SAA		SP		
40							SP		

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	**LOG of WELL:** WHF-16-3D	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM		**PROJECT NO:** RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	**DATE STARTED:** 01/22/93	**COMPLTD:** 01/26/93
METHOD: MUD ROTARY	**CASE SIZE:** 2"	**SCREEN INT.:** 105-115 FT
PROTECTION LEVEL: D		
TOC ELEV.: 51.47 FT.	**MONITOR INST.:** OVA	**TOT DPTH:** 115FT.
DPTH TO ▽ 10.32 FT.		
LOGGED BY: W. Colby-George	**WELL DEVELOPMENT DATE:**	**SITE:** 16 - S.W. Landfill

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					SAA		SP		
45					SAND - white, medium.		SP		
50					SAND - yellow brown, some fine, trace gravel.		SP		
55					SAA		SP		
60					SAA		SP		
65					SAA		SP		
70					SAA		SP		
75					SAND - fine sand, purple gravel.		SP		
80							SP		

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-16-3D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 01/22/93	COMPLTD: 01/26/93
METHOD: MUD ROTARY / CASE SIZE: 2"	SCREEN INT.: 105-115 FT	PROTECTION LEVEL: D
TOC ELEV.: 51.47 FT. / MONITOR INST.: OVA	TOT DPTH: 115FT.	DPTH TO ▽ 10.32 FT.
LOGGED BY: W. Colby-George	WELL DEVELOPMENT DATE:	SITE: 16 - S.W. Landfill

Continued from PAGE 2

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					SAND - yellow, medium to coarse, trace clay.		SP		
85					SAA		SP		
90					SAA		SP		
95					SILTY SAND - gray, clay 6".		SM		
100					SAA, no clay.		SM		
105					SAA		SM		
110					SILTY SAND - gray, clay, very plastic.		SM		
115							SP		
120									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-16-3II	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA

CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 01/25/93	COMPLTD: 01/25/93
METHOD: MUD ROTARY	CASE SIZE: 2"	SCREEN INT.: 75-80 FT	PROTECTION LEVEL: D
TOC ELEV.: 51.31 FT.	MONITOR INST.: OVA	TOT DPTH: 80FT.	DPTH TO ▽ 13.38 FT.
LOGGED BY: W. Colby-George	WELL DEVELOPMENT DATE:		SITE: 16 - S.W. Landfill

DEPTH FT.	INTERVAL SAMPLED	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5				SEE WHF-16-3D FOR LITHOLOGICAL DESCRIPTION.				
10								
15								▽
20								
25								
30								
35								
40								

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-18-3II	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 01/25/93	COMPLTD: 01/25/93
METHOD: MUD ROTARY	CASE SIZE: 2"	SCREEN INT.: 75-80 FT
PROTECTION LEVEL: D		
TOC ELEV.: 51.31 FT.	MONITOR INST.: OVA	TOT DPTH: 80FT.
DPTH TO ∇ 13.38 FT.		
LOGGED BY: W. Colby-George	WELL DEVELOPMENT DATE:	SITE: 18 - S.W. Landfill

DEPTH FT.	INTERVAL SAMPLED	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				Continued from PAGE 1				
45								
50								
55								
60								
65								
70								
75								
80								

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-16-4D	BORING NO. N/A
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 02/02/93	COMPLTD: 02/18/93
METHOD: MUD ROT.	CASE SIZE: 6" & 2"	SCREEN INT.: 109-119 FT
PROTECTION LEVEL: D		
TOC ELEV.: 52.95 FT.	MONITOR INST.: OVA	TOT DPTH: 121FT.
DPTH TO ▽ 14.16 FT.		
LOGGED BY: M. Alvarez	WELL DEVELOPMENT DATE:	SITE: 16 - Wastewater Plt.

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5			18/24	0	SILTY SAND - Light brown, poorly graded, slightly plastic, loose, moist.		SM	3,5,7,18	
10			22/24	0	Same As Above, yellowish brown, 1 in. clay lense.		SM		
15			22/24	0	SAND - tan to reddish brown, fine to medium, 2" layer of sandy silt, loose, and wet.		SP		▽
20			10/24	< 1	SAND - tan, fine, poorly graded, loose, wet.		SP		
25			20/24	5	SAND - tan, fine to coarse, little fine gravel, trace silt, well graded, loose, wet.		SW		
30			04/24	1	SAND - tan, coarse, loose, poorly graded, wet.		SP		
35			20/24	20	SAND - tan, coarse, some medium to fine sand, well graded, wet.		SW		
40			12/24	3	Same As Above.		SW		

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	**LOG of WELL:** WHF-16-4D	**BORING NO.** N/A
CLIENT: SOUTHNAVFACENGCOM		**PROJECT NO:** RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	**DATE STARTED:** 02/02/93	**COMPLTD:** 02/18/93
METHOD: MUD ROT.	**CASE SIZE:** 6" & 2"	**SCREEN INT.:** 109-119 FT
PROTECTION LEVEL: D		
TOC ELEV.: 52.95 FT.	**MONITOR INST.:** OVA	**TOT DPTH:** 121FT.
DPTH TO ∇ 14.16 FT.		
LOGGED BY: M. Alvarez	**WELL DEVELOPMENT DATE:**	**SITE:** 16 - Wastewater Plt.

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			12/24	2	SAND - purple to yellow, fine, trace silt, poorly graded, wet.		SP		
46									
			08/24	2.5	SAND - pinkish tan, fine to medium, poorly graded, wet.		SP		
51									
			08/24	2.5	Same As Above.		SP		
56									
			08/24	5	SAND - tan to purple, fine to coarse, with shell fragments.		SP		
61									
			08/24	0	CLAY - grey and red mottled firm, plastic.		CL		
66			24/24	0	CLAY - grey, lenses of purple and orange very fine sand, firm, very plastic.				
			08/24	< 1	SAND - light tan, fine, poorly graded, trace silt, wet.		SP	3,5,4,3	
71									
			20/24	---	CLAY - light tan, low plasticity, sharp contact at 74 ft. to SAND, moderate reddish brown, fine to medium, poorly graded.		CL/SP	1,1,2,4	
76									
			18/24	---	SAND - yellowish orange, fine to some medium, poorly graded, wet.		SP	11,22,24,27	
81									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: WHF-16-4D	BORING NO. N/A
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 02/02/93	COMPLTD: 02/18/93
METHOD: MUD ROT.	CASE SIZE: 6" & 2"	SCREEN INT.: 109-119 FT
PROTECTION LEVEL: D	TOC ELEV.: 52.95 FT.	MONITOR INST.: OVA
TOT DPTH: 121FT.	DPTH TO ▽ 14.16 FT.	
LOGGED BY: M. Alvarez	WELL DEVELOPMENT DATE:	SITE: 16 - Wastewater Plt.

Continued from PAGE 2

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			12/24	---	SAND - purple to brown, fine to medium, poorly graded, wet.		SP	4,8,10,14	
87			24/24	0	SAND - tan to purple, fine, poorly graded.		SP	15,26,22,18	
92			22/24	0	SAND - tan to greyish brown, fine, poorly graded, wet, some coarse at 90 ft.		SP	14,18,18,15	
97			18/24	2	SAND - tan to purple, fine, poorly graded, wet.		SP	13,23,22,24	
102			23/24	2	SAND - tan to yellowish orange, fine, poorly graded, wet, some coarse.		SP	13,17,27,29	
107			08/24	0	Same As Above.		SP	5,4,3,3	
112			20/24	---	SAND - greyish purple, yellow bands, fine, poorly graded, wet.		SP		
							SP		
117			07/24	---	SAND - yellowish orange, fine to medium, poorly sorted to 119 ft., over 3 in. of purple angular gravel, over 9 in. of CLAY, grey, tight, highly plastic, stiff.		CL	DROP	
122									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	**LOG of WELL:** WHF-16-4S	**BORING NO.**
CLIENT: SOUTHNAVFACENGCOM		**PROJECT NO:** RI PHASE IIA

CONTRACTOR: Groundwater Protection Inc.		**DATE STARTED:** 02/03/93	**COMPLTD:** 02/04/93
METHOD: HSA	**CASE SIZE:** 2"	**SCREEN INT.:** 5-20 FT	**PROTECTION LEVEL:** D
TOC ELEV.: 54.92 FT.	**MONITOR INST.:** OVA	**TOT DPTH:** 21FT.	**DPTH TO ∇** 16.66 FT.
LOGGED BY: N. Haglin	**WELL DEVELOPMENT DATE:**		**SITE:** 16 - Open Disposal/Burn Area

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN
				0	SILTY SAND - fine, ash, glass, and metal.			6,9,12,14
5			18/24	0	SILTY SAND - reddish brown, fine, poorly graded with a 2" lens of light grey sandy clay at 5 ft. bls, moist.		SM	15,17,20,24
10			12/24	0	Same as above, grey silty lenses at depth.		SM	7,16,17,15
15			22/24	0	Same as above, tan to reddish brown, saturated.		SM	2,4,5,7
20								
25								
30								
35								
40								

WELL DATA

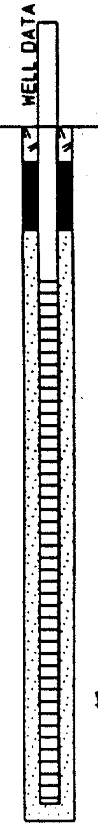


 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Whiting Field	LOG of WELL: WHF-16-6S	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services	DATE STARTED: 04/26/96	COMPLTD: 04/26/96

METHOD: Hollow Stem Auger	CASE SIZE: 2 inches	SCREEN INT.: 15 feet	PROTECTION LEVEL: D
TOC ELEV.: 56.57 FT.	MONITOR INST.: OVA	TOT DPTH: 25FT.	DPTH TO ▽ FT.
LOGGED BY: J. Beauchamp	WELL DEVELOPMENT DATE: 4/26/96		SITE: 16

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0–1					Fine SAND, some silt, moist, light orange.		SP		
3					Silty fine SAND, light orange, damp.				
7					CLAYEY SILT, wet, dark gray.		ML		
12					SILTY CLAY, some silt, wet, moderate gray.		CL		
15				0	As above, moist, light gray.		ML	7,21,15,12	
16					SILT, some clay, loose, moist, light gray.		CL		
17					CLAY, some silt, dry, light gray.		SM		
18					Fine SAND, some silt, moist, light gray.				
18.5					Fine SAND, some silt, moist, greenish orange.				

TITLE: NAS Whiting Field	LOG of WELL: WHF-16-6I	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 04/01/96	COMPLTD: 04/01/96

METHOD: Mud Rotary	CASE SIZE: 2 inches	SCREEN INT.: 10 feet	PROTECTION LEVEL: D
TOC ELEV.: 56.77 FT.	MONITOR INST.: FID	TOT DPTH: 60FT.	DPTH TO ∇ FT.
LOGGED BY: F. Rizk	WELL DEVELOPMENT DATE:		SITE: 16

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
1					0-2.5 Feet: Fine SAND, light orange brown, wet, little or no fines, poorly graded.		SP		
2									
3					Not logged.				
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

TITLE: NAS Whiting Field	LOG of WELL: WHF-16-6I	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 04/01/96	COMPLTD: 04/01/96
METHOD: Mud Rotary	CASE SIZE: 2 inches	SCREEN INT.: 10 feet	PROTECTION LEVEL: D
TOC ELEV.: 56.77 FT.	MONITOR INST.: FID	TOT DPTH: 60FT.	DPTH TO ▽ FT.
LOGGED BY: F. Rizk	WELL DEVELOPMENT DATE:		SITE: 16

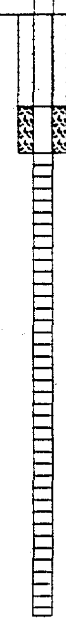
Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
31–53							SP		
54				0	Coarse to fine SAND, well graded, minor pebbles		SW	12,12,12,12	
55			0		Silty CLAY, gray, with pebbles, low plasticity.				
56					Gravelly SAND, coarse to fine, light orange to red brown.				
57–60									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Whiting Field	LOG of WELL: WHF-16-7S		BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.		DATE STARTED: 04/09/96	COMPLTD: 04/09/96
METHOD: Hollow Stem Auger	CASE SIZE: 2 inches	SCREEN INT.: 10 feet	PROTECTION LEVEL: D
TOC ELEV.: 38.27 FT.	MONITOR INST.: FID	TOT DPTH: 15FT.	DPTH TO ▽ FT.
LOGGED BY: F. Risk	WELL DEVELOPMENT DATE: 4/09/96		SITE: 16

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
1					Medium SAND, moderately sorted, some silt, wet, yellowish-orange.		SP		
2									
3									
4									
5					Medium SAND, poorly sorted, some silt, wet, light yellowish orange.			1,1,1,1	
6									
7					Fine SAND, poorly sorted, wet, light yellowish orange.		SM		
8									
9									
10					Fine SAND, well sorted, some silt, wet, dark gray.				
11									
12									
13					Note: Natural soil used as sand pack.				
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									



TITLE: NAS Whiting Field	LOG of WELL: WHF-16-71	BORING NO.
IENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 04/25/96	COMPLTD: 04/25/96

METHOD: Hollow Stem Auger	CASE SIZE: 2 inches	SCREEN INT.: 10 feet	PROTECTION LEVEL: D
TOC ELEV.: 38.17 FT.	MONITOR INST.: FID	TOT DPTH: 45FT.	DPTH TO ▽ FT.
LOGGED BY: F. Risk	WELL DEVELOPMENT DATE: 4/09/96		SITE: 16

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0					Fine SAND, pale-yellowish brown, poorly graded, no organics.		SM		
2			0/0						
5					Fine SAND, poorly graded, brownish/black, no organics.				

Depth scale: 1–30 ft.

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS Whiting Field	LOG of WELL: WHF-16-71	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services, Inc.	DATE STARTED: 04/25/96	COMPLTD: 04/25/96
METHOD: Hollow Stem Auger	CASE SIZE: 2 inches	SCREEN INT.: 10 feet
PROTECTION LEVEL: D		
TOC ELEV.: 38.17 FT.	MONITOR INST.: FID	TOT DPTH: 45FT.
DPTH TO ▽ FT.		
LOGGED BY: F. Risk	WELL DEVELOPMENT DATE: 4/09/96	SITE: 16

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
31							SM		
32									
33									
34									
35							SP	12,12,12,12	
36									
37					Medium SAND, grayish orange, saturated.				
38									
39									
40									
41									
42									
43									
44									
45					Boring terminated @ 45 feet below land surface.				
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

TITLE: NAS Whiting Field	LOG of WELL: WHF-16-7D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services	DATE STARTED: 04/26/96	COMPLTD: 04/26/96
METHOD: Mud Rotary	CASE SIZE: 2 inch	SCREEN INT.: 10 feet
PROTECTION LEVEL: D	TOC ELEV.: 38.05 FT.	MONITOR INST.: FID
TOT DPTH: 75FT.	DPTH TO ▽ FT.	
LOGGED BY: J. Beauchamp	WELL DEVELOPMENT DATE: 4/26/96	SITE: 16

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
							SP		
1									
2									
3							SM		
4									
5									
6									
7									
8									
9									
10									
11									
12				0					
13									
14									
15									
16									
17				0					
18									
19									
20									
21									
22									
23									
24									
25									
26									
27				0					
28									
29									
30									

TITLE: NAS Whiting Field	LOG of WELL: WHF-16-7D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services	DATE STARTED: 04/26/96	COMPLTD: 04/26/96
METHOD: Mud Rotary	CASE SIZE: 2 inch	SCREEN INT.: 10 feet	PROTECTION LEVEL: D
TOC ELEV.: 38.05 FT.	MONITOR INST.: FID	TOT DPTH: 75FT.	DPTH TO ▽ FT.
LOGGED BY: J. Beauchamp	WELL DEVELOPMENT DATE: 4/26/96		SITE: 16

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
							SM		
31									
32				0					
33									
34									
35									
36									
37									
38									
39									
40									
41									
42				0					
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53				0					
54									
55									
56									
57									
58									
59									
60									

TITLE: NAS Whiting Field		LOG of WELL: WHF-16-7D	BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 02534.09
CONTRACTOR: ABB Environmental Services		DATE STARTED: 04/26/96	COMPLTD: 04/26/96
METHOD: Mud Rotary	CASE SIZE: 2 inch	SCREEN INT.: 10 feet	PROTECTION LEVEL: D
TOC ELEV.: 38.05 FT.	MONITOR INST.: FID	TOT DPTH: 75FT.	DPTH TO ▽ FT.
LOGGED BY: J. Beauchamp	WELL DEVELOPMENT DATE: 4/26/96		SITE: 16

Continued from PAGE 2

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
61							SM		
63				0					
67				0	SAND, orange-pink medium grained, poorly graded, no organics.		SP		
68			0/0						
75				0	Boring terminated @ 75 feet below land surface.				

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: N/A	BORING NO. TEST PIT 16-01A-B
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: UXB INC.	DATE STARTED: 10/4/92	COMPLTD: 10/4/92
METHOD: BACK HOE	CASE SIZE: N/A	SCREEN INT.: N/A
PROTECTION LEVEL: 0		
TOC ELEV.: FT. FT.	MONITOR INST.: FIO.LEL.RM	TOT DPTH: 12FT.
DPTH TO ∇ FT.		
LOGGED BY:	WELL DEVELOPMENT DATE: 10/13/92	SITE: 16

DEPTH FT.	METHANE (ppm)	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0	0			0	SAND - Reddish orange, fine to medium with metal debris		SP		
1				0	SAND - Light yellow to orange, medium to fine samd - general construction debris				
2				0	Clay layer tan		CL		
2.5							ML		
3				0	Sandy CLAY to white			WHF-2A-16-SS -01-01	
5					Sandy CLAY white mottled red				
8					White CLAY		CH		
10					Test pit terminated				
11									
12									

 HARDING LAWSON ASSOCIATES

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: N/A	BORING NO. TEST PIT 16-02A-B
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: UXB INC.	DATE STARTED: 10/4/92	COMPLTD: 10/4/92

METHOD: BACK HOE	CASE SIZE: N/A	SCREEN INT.: N/A	PROTECTION LEVEL: 0
TOC ELEV.: FT. FT.	MONITOR INST.: FIO.LEL.RM	TOT DPTH: 12FT.	DPTH TO ∇ FT.
LOGGED BY:	WELL DEVELOPMENT DATE: 10/13/92		SITE: 16

DEPTH FT.	METHANE (ppm)	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0–1				0	CLAYEY SAND - yellow orange, fine to medium. Broken bottles		ML		
1–2					CLAYEY SAND - yellowish orange, Burned material, broken bottles, metal debris, cans etc.				
2–3	35 150			25 20	As above			WHF-2A-16-SS -01-01	
3–4	1,000			2,500	As above				
4–7	0			500	White CLAY mottled with yellow/orange,burned material, broken bottles metal debris,cans and galvanized pipe.		CH		
7–10					White CLAY with fill material				
10					Test pit terminated				
11									
12									

HARDING LAWSON ASSOCIATES

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: N/A	BORING NO. TEST PIT 16-03A-B
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: UXB INC.	DATE STARTED: 10/4/92	COMPLTD: 10/4/92
METHOD: BACK HOE	CASE SIZE: N/A	SCREEN INT.: N/A
PROTECTION LEVEL: 0		
TOC ELEV.: FT. FT.	MONITOR INST.: FIO.LEL.RM	TOT DPTH: 12FT.
DPTH TO ▽ FT.		
LOGGED BY:	WELL DEVELOPMENT DATE: 10/13/92	SITE: 16

DEPTH FT.	METHANE (ppm)	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0	0			0	Topsoil to dark brown clay		OH		
1							OH		
				50	Black CLAY with charred material				
2									
3	5,000			20000	White CLAY , Burned material, metal degris, cans, broken bottles				
4									
5									
6				10	Black clay				
								WHF-2A-16-SS-03-02	
7									
8					Test pit terminated				
9									
10									
11									
12									

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: N/A	BORING NO. TEST PIT 16-04A-B
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: UXB INC.	DATE STARTED: 10/4/92	COMPLTD: 10/4/92
METHOD: BACK HOE	CASE SIZE: N/A	SCREEN INT.: N/A	PROTECTION LEVEL: 0
TOC ELEV.: FT. FT.	MONITOR INST.: FIO.LEL.RM	TOT DPTH: 12FT.	DPTH TO ▽ FT.
LOGGED BY:	WELL DEVELOPMENT DATE: 10/13/92		SITE: 16

DEPTH FT.	METHANE (ppm)	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					Top soil organic material		OH		
				0			CL		
1									
				0					
2									
				60	Tan CLAYES Sand/ saturated charred material, burned metal, 10-gallon cans				
3									
				2					
4									
					CLAY-saturated, observed wire bundles				
5									
6									
7									
8									
				1	Tan CLAY saturated, observed fill material				
9								WHF-24-16-SS 04-03 with MS,MSD,and Dup.	
10									
11				0	Grey to tan CLAY				
12									

HARDING LAWSON ASSOCIATES

TITLE: NAVAL AIR STATION WHITING FIELD	**LOG of WELL:** N/A	**BORING NO.** TEST PIT 16-05A-B
CLIENT: SOUTHNAVFACENGCOM		**PROJECT NO:** RI PHASE IIA
CONTRACTOR: UXB INC.	**DATE STARTED:** 10/4/92	**COMPLTD:** 10/4/92
METHOD: BACK HOE	**CASE SIZE:** N/A	**SCREEN INT.:** N/A
PROTECTION LEVEL: 0		
TOC ELEV.: FT. FT.	**MONITOR INST.:** FIO.LEL.RM	**TOT DPTH:** 12FT.
DPTH TO ⊻ FT.		
LOGGED BY:	**WELL DEVELOPMENT DATE:** 10/13/92	**SITE:** 16

DEPTH FT.	METHANE (ppm)	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					Top soil - organic matter dark brown to black		OH		
				0			SC		
1					Clayey sand - tan				
				2.0			ML		
2									
	50			100					
3									
	9			25					
4					Clayey SAND yellowish orange to tan burned debris - metal, cans, bottles, ash, ect.				
5									
	100			200					
6									
7					Test pit terminated				
8									
9									
10									
11									
12									

HARDING LAWSON ASSOCIATES

TITLE: NAVAL AIR STATION WHITING FIELD	LOG of WELL: N/A	BORING NO. TEST PIT 16-06A-B
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: UXB INC.	DATE STARTED: 10/4/92	COMPLTD: 10/4/92
METHOD: BACK HOE	CASE SIZE: N/A	SCREEN INT.: N/A
PROTECTION LEVEL: 0		
TOC ELEV.: FT. FT.	MONITOR INST.: FIO.LEL.RM	TOT DPTH: 12FT.
DPTH TO ▽ FT.		
LOGGED BY:	WELL DEVELOPMENT DATE: 10/13/92	SITE: 16

DEPTH FT.	METHANE (ppm)	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					Top soil		OH		
	0			0	SAND yellow/orange metal debris, bottles. etal pipe, cans, springs, Engine parts, Air Craft parts, charred parts		SP		
1									
	0			0					
2									
	0			1					
3							OH		
	3			5	CLAY yellowish orange No debris				
4							ML		
5									
6									
7					Tan Clayey SAND with debris as above				
				0					
8									
9									
10				0				WHF-2A-16-SS -05-04	
					Test pit terminated				
11									
12									

HARDING LAWSON ASSOCIATES

APPENDIX D

SOIL ANALYTICAL DATA

Lab Sample Number:		22891006				22897001				22898001				22898001			
Site		WHITING				WHITING				WHITING				WHITING			
Locator		16SS0201				16SS0302				16SS0403				16SS0403			
Collect Date:		04-OCT-92				04-OCT-92				11-SEP-92				05-OCT-92			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/kg																
Chloromethane		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Bromomethane		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Vinyl chloride		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Chloroethane		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Methylene chloride		120	UJ	ug/kg	11	31	UJ	ug/kg	11	-		ug/kg		150	J	ug/kg	12
Acetone		130	UJ	ug/kg	11	11	UJ	ug/kg	11	-		ug/kg		150	UJ	ug/kg	12
Carbon disulfide		26		ug/kg	11	5	J	ug/kg	11	-		ug/kg		13		ug/kg	12
1,1-Dichloroethene		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
1,1-Dichloroethane		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
1,2-Dichloroethene (total)		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Chloroform		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
1,2-Dichloroethane		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
2-Butanone		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	UJ	ug/kg	12
1,1,1-Trichloroethane		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Carbon tetrachloride		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Bromodichloromethane		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
1,2-Dichloropropane		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
cis-1,3-Dichloropropene		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Trichloroethene		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Dibromochloromethane		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
1,1,2-Trichloroethane		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Benzene		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
trans-1,3-Dichloropropene		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Bromoform		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
4-Methyl-2-pentanone		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
2-Hexanone		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Tetrachloroethene		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Toluene		1	J	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
1,1,2,2-Tetrachloroethane		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Chlorobenzene		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Ethylbenzene		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		2	J	ug/kg	12
Styrene		11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg		12	U	ug/kg	12
Xylenes (total)		11	J	ug/kg	11	3	J	ug/kg	11	-		ug/kg		7	J	ug/kg	12
CLP SEMIVOLATILES 90-SOW	ug/kg																
Phenol		370	U	ug/kg	370	370	UJ	ug/kg	370	-		ug/kg		400	U	ug/kg	400
bis(2-Chloroethyl) ether		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
2-Chlorophenol		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
1,3-Dichlorobenzene		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
1,4-Dichlorobenzene		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
1,2-Dichlorobenzene		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
2-Methylphenol		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
2,2-oxybis(1-Chloropropane)		370	UJ	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	UJ	ug/kg	400
4-Methylphenol		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
N-Nitroso-di-n-propylamine		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	UJ	ug/kg	400
Hexachloroethane		370	UJ	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Nitrobenzene		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	UJ	ug/kg	400
Isophorone		370	UJ	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	UJ	ug/kg	400
2-Nitrophenol		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
2,4-Dimethylphenol		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400

Naval Air Station Whiting Field, Milton, Florida
Site 16 Subsurface Soil Data

Lab Sample Number:	22891006				22897001				22898001				22898001			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16SS0201				16SS0302				16SS0403				16SS0403			
Collect Date:	04-OCT-92				04-OCT-92				11-SEP-92				05-OCT-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
bis(2-Chloroethoxy) methane	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
2,4-Dichlorophenol	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
1,2,4-Trichlorobenzene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Naphthalene	39	J	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
4-Chloroaniline	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Hexachlorobutadiene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
4-Chloro-3-methylphenol	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
2-Methylnaphthalene	39	J	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Hexachlorocyclopentadiene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
2,4,6-Trichlorophenol	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
2,4,5-Trichlorophenol	900	U	ug/kg	900	910	U	ug/kg	910	-		ug/kg		980	U	ug/kg	980
2-Chloronaphthalene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
2-Nitroaniline	900	U	ug/kg	900	910	U	ug/kg	910	-		ug/kg		980	U	ug/kg	980
Dimethylphthalate	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Acenaphthylene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
2,6-Dinitrotoluene	370	UJ	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
3-Nitroaniline	900	U	ug/kg	900	910	U	ug/kg	910	-		ug/kg		980	U	ug/kg	980
Acenaphthene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
2,4-Dinitrophenol	900	U	ug/kg	900	910	UJ	ug/kg	910	-		ug/kg		980	U	ug/kg	980
4-Nitrophenol	900	U	ug/kg	900	910	U	ug/kg	910	-		ug/kg		980	U	ug/kg	980
Dibenzofuran	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
2,4-Dinitrotoluene	370	UJ	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Diethylphthalate	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
4-Chlorophenyl-phenylether	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Fluorene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
4-Nitroaniline	900	U	ug/kg	900	910	U	ug/kg	910	-		ug/kg		980	U	ug/kg	980
4,6-Dinitro-2-methylphenol	900	U	ug/kg	900	910	U	ug/kg	910	-		ug/kg		980	U	ug/kg	980
N-Nitrosodiphenylamine	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
4-Bromophenyl-phenylether	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Hexachlorobenzene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Pentachlorophenol	900	U	ug/kg	900	910	U	ug/kg	910	-		ug/kg		980	U	ug/kg	980
Phenanthrene	58	J	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Anthracene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Carbazole	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Di-n-butylphthalate	370	UJ	ug/kg	370	370	UJ	ug/kg	750	-		ug/kg		400	UJ	ug/kg	400
Fluoranthene	120	J	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Pyrene	77	J	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Butylbenzylphthalate	370	UJ	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	UJ	ug/kg	400
3,3-Dichlorobenzidine	370	U	ug/kg	370	370	UJ	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Benzo (a) anthracene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Chrysene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
bis(2-Ethylhexyl) phthalate	370	UJ	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	UJ	ug/kg	400
Di-n-octylphthalate	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Benzo (b) fluoranthene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Benzo (k) fluoranthene	370	UJ	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Benzo (a) pyrene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Indeno (1,2,3-cd) pyrene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Dibenzo (a,h) anthracene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
Benzo (g,h,i) perylene	370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg		400	U	ug/kg	400
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	1.9	U	ug/kg	1.9	1.9	UJ	ug/kg	1.9	-		ug/kg		-		ug/kg	

	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Lab Sample Number:		22891006				22897001				22898001				22898001		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16SS0201				16SS0302				16SS0403				16SS0403		
Collect Date:		04-OCT-92				04-OCT-92				11-SEP-92				05-OCT-92		
beta-BHC	1.9	U	ug/kg	1.9	1.9	UJ	ug/kg	1.9	-		ug/kg		-		ug/kg	
delta-BHC	1.9	U	ug/kg	1.9	1.9	UJ	ug/kg	1.9	-		ug/kg		-		ug/kg	
gamma-BHC (Lindane)	1.9	U	ug/kg	1.9	1.9	UJ	ug/kg	1.9	-		ug/kg		-		ug/kg	
Heptachlor	1.9	U	ug/kg	1.9	1.9	UJ	ug/kg	1.9	-		ug/kg		-		ug/kg	
Aldrin	1.9	U	ug/kg	1.9	1.9	UJ	ug/kg	1.9	-		ug/kg		-		ug/kg	
Heptachlor epoxide	1.9	U	ug/kg	1.9	1.9	UJ	ug/kg	1.9	-		ug/kg		-		ug/kg	
Endosulfan I	1.9	U	ug/kg	1.9	1.9	UJ	ug/kg	1.9	-		ug/kg		-		ug/kg	
Dieldrin	1.6	J	ug/kg	3.7	3.7	UJ	ug/kg	3.7	-		ug/kg		-		ug/kg	
4,4-DDE	1.8	J	ug/kg	3.7	3.7	UJ	ug/kg	3.7	-		ug/kg		-		ug/kg	
Endrin	3.7	U	ug/kg	3.7	3.7	UJ	ug/kg	3.7	-		ug/kg		-		ug/kg	
Endosulfan II	3.7	U	ug/kg	3.7	3.7	UJ	ug/kg	3.7	-		ug/kg		-		ug/kg	
4,4-DDD	2.2	J	ug/kg	3.7	3.7	UJ	ug/kg	3.7	-		ug/kg		-		ug/kg	
Endosulfan sulfate	3.7	U	ug/kg	3.7	3.7	UJ	ug/kg	3.7	-		ug/kg		-		ug/kg	
4,4-DDT	3.7	U	ug/kg	3.7	3.7	UJ	ug/kg	3.7	-		ug/kg		-		ug/kg	
Methoxychlor	19	U	ug/kg	19	19	UJ	ug/kg	19	-		ug/kg		-		ug/kg	
Endrin ketone	3.7	U	ug/kg	3.7	3.7	UJ	ug/kg	3.7	-		ug/kg		-		ug/kg	
Endrin aldehyde	3.7	U	ug/kg	3.7	3.7	UJ	ug/kg	3.7	-		ug/kg		-		ug/kg	
alpha-Chlordane	1.9	U	ug/kg	1.9	1.9	UJ	ug/kg	1.9	-		ug/kg		-		ug/kg	
gamma-Chlordane	1.9	U	ug/kg	1.9	1.9	UJ	ug/kg	1.9	-		ug/kg		-		ug/kg	
Toxaphene	190	U	ug/kg	190	190	UJ	ug/kg	190	-		ug/kg		-		ug/kg	
Aroclor-1016	37	U	ug/kg	37	37	UJ	ug/kg	37	-		ug/kg		-		ug/kg	
Aroclor-1221	75	U	ug/kg	75	76	UJ	ug/kg	76	-		ug/kg		-		ug/kg	
Aroclor-1232	37	U	ug/kg	37	37	UJ	ug/kg	37	-		ug/kg		-		ug/kg	
Aroclor-1242	37	U	ug/kg	37	37	UJ	ug/kg	37	-		ug/kg		-		ug/kg	
Aroclor-1248	37	U	ug/kg	37	37	UJ	ug/kg	37	-		ug/kg		-		ug/kg	
Aroclor-1254	37	U	ug/kg	37	37	UJ	ug/kg	37	-		ug/kg		-		ug/kg	
Aroclor-1260	37	U	ug/kg	37	37	UJ	ug/kg	37	-		ug/kg		-		ug/kg	
CLP METALS AND CYANIDE mg/kg																
Aluminum	17000		mg/kg	40	15400		mg/kg	40	29000		mg/kg	40	-		mg/kg	
Antimony	2.5	J	mg/kg	12	2.4	U	mg/kg	12	2.6	UJ	mg/kg	12	-		mg/kg	
Arsenic	2.7		mg/kg	2	1.5	J	mg/kg	2	5.1	J	mg/kg	2	-		mg/kg	
Barium	36	J	mg/kg	40	35	J	mg/kg	40	21	J	mg/kg	40	-		mg/kg	
Beryllium	.18	J	mg/kg	1	.21	J	mg/kg	1	.23	J	mg/kg	1	-		mg/kg	
Cadmium	2.4	J	mg/kg	1	.67	U	mg/kg	1	.74	U	mg/kg	1	-		mg/kg	
Calcium	877	J	mg/kg	1000	254	J	mg/kg	1000	478	UJ	mg/kg	1000	-		mg/kg	
Chromium	16.6		mg/kg	2	10.5		mg/kg	2	32.5	J	mg/kg	2	-		mg/kg	
Cobalt	1.1	J	mg/kg	10	1.2	J	mg/kg	10	2.4	J	mg/kg	10	-		mg/kg	
Copper	16.2		mg/kg	5	4.8	J	mg/kg	5	13.7		mg/kg	5	-		mg/kg	
Iron	8440		mg/kg	20	6670		mg/kg	20	21700		mg/kg	20	-		mg/kg	
Lead	74.6		mg/kg	1	6.8		mg/kg	1	17.3	J	mg/kg	1	-		mg/kg	
Magnesium	243	J	mg/kg	1000	293	J	mg/kg	1000	211	J	mg/kg	1000	-		mg/kg	
Manganese	93.1		mg/kg	3	231		mg/kg	3	54		mg/kg	3	-		mg/kg	
Mercury	.29	J	mg/kg	.1	.43	J	mg/kg	.1	.14	UJ	mg/kg	.1	-		mg/kg	
Nickel	4.4	J	mg/kg	8	4.4	J	mg/kg	8	4.4	J	mg/kg	8	-		mg/kg	
Potassium	258	J	mg/kg	1000	153	U	mg/kg	1000	270	J	mg/kg	1000	-		mg/kg	
Selenium	.47	U	mg/kg	1	.47	U	mg/kg	1	.51	R	mg/kg	1	-		mg/kg	
Silver	.79	J	mg/kg	2	.46	U	mg/kg	2	.64	UJ	mg/kg	2	-		mg/kg	
Sodium	243	J	mg/kg	1000	207	J	mg/kg	1000	223	UJ	mg/kg	1000	-		mg/kg	
Thallium	.35	U	mg/kg	2	.36	U	mg/kg	2	.39	UJ	mg/kg	2	-		mg/kg	
Vanadium	25		mg/kg	10	19.1		mg/kg	10	63.3		mg/kg	10	-		mg/kg	
Zinc	122		mg/kg	4	10.6	J	mg/kg	4	43	J	mg/kg	4	-		mg/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 16 Subsurface Soil Data

Lab Sample Number:	22891006				22897001				22898001				22898001			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16SS0201				16SS0302				16SS0403				16SS0403			
Collect Date:	04-OCT-92				04-OCT-92				11-SEP-92				05-OCT-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Cyanide	.09	U	mg/kg	1	.09	UJ	mg/kg	1	.1	R	mg/kg	1	-		mg/kg	
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	

Lab Sample Number:		22898001				22898002				22898002				22898002		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16SS0403				16SS0403A				16SS0403A				16SS0403A		
Collect Date:		05-OCT-93				11-SEP-92				05-OCT-92				05-OCT-93		
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/kg															
Chloromethane		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Bromomethane		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Vinyl chloride		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Chloroethane		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Methylene chloride		-		ug/kg		-		ug/kg		46	UJ	ug/kg	12	-		ug/kg	
Acetone		-		ug/kg		-		ug/kg		140	UJ	ug/kg	12	-		ug/kg	
Carbon disulfide		-		ug/kg		-		ug/kg		9	J	ug/kg	12	-		ug/kg	
1,1-Dichloroethene		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
1,1-Dichloroethane		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
1,2-Dichloroethene (total)		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Chloroform		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
1,2-Dichloroethane		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
2-Butanone		-		ug/kg		-		ug/kg		12	UJ	ug/kg	12	-		ug/kg	
1,1,1-Trichloroethane		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Carbon tetrachloride		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Bromodichloromethane		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
1,2-Dichloropropane		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
cis-1,3-Dichloropropene		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Trichloroethene		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Dibromochloromethane		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
1,1,2-Trichloroethane		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Benzene		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
trans-1,3-Dichloropropene		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Bromoform		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
4-Methyl-2-pentanone		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
2-Hexanone		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Tetrachloroethene		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Toluene		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
1,1,2,2-Tetrachloroethane		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Chlorobenzene		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Ethylbenzene		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Styrene		-		ug/kg		-		ug/kg		12	U	ug/kg	12	-		ug/kg	
Xylenes (total)		-		ug/kg		-		ug/kg		5	J	ug/kg	12	-		ug/kg	
CLP SEMIVOLATILES 90-SOW	ug/kg															
Phenol		-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
bis(2-Chloroethyl) ether		-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
2-Chlorophenol		-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
1,3-Dichlorobenzene		-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
1,4-Dichlorobenzene		-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 16 Subsurface Soil Data

Lab Sample Number:		22898001				22898002				22898002				22898002		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16SS0403				16SS0403A				16SS0403A				16SS0403A		
Collect Date:		05-OCT-93				11-SEP-92				05-OCT-92				05-OCT-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
2-Methylphenol	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
2,2-oxybis(1-Chloropropane)	-		ug/kg		-		ug/kg		430	UJ	ug/kg	430	-		ug/kg	
4-Methylphenol	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
N-Nitroso-di-n-propylamine	-		ug/kg		-		ug/kg		430	UJ	ug/kg	430	-		ug/kg	
Hexachloroethane	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Nitrobenzene	-		ug/kg		-		ug/kg		430	UJ	ug/kg	430	-		ug/kg	
Isophorone	-		ug/kg		-		ug/kg		430	UJ	ug/kg	430	-		ug/kg	
2-Nitrophenol	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
2,4-Dimethylphenol	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
bis(2-Chloroethoxy) methane	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
2,4-Dichlorophenol	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
1,2,4-Trichlorobenzene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Naphthalene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
4-Chloroaniline	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Hexachlorobutadiene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
4-Chloro-3-methylphenol	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
2-Methylnaphthalene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Hexachlorocyclopentadiene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
2,4,6-Trichlorophenol	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
2,4,5-Trichlorophenol	-		ug/kg		-		ug/kg		1100	U	ug/kg	1100	-		ug/kg	
2-Chloronaphthalene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
2-Nitroaniline	-		ug/kg		-		ug/kg		1100	U	ug/kg	1100	-		ug/kg	
Dimethylphthalate	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Acenaphthylene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
2,6-Dinitrotoluene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
3-Nitroaniline	-		ug/kg		-		ug/kg		1100	U	ug/kg	1100	-		ug/kg	
Acenaphthene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
2,4-Dinitrophenol	-		ug/kg		-		ug/kg		1100	U	ug/kg	1100	-		ug/kg	
4-Nitrophenol	-		ug/kg		-		ug/kg		1100	U	ug/kg	1100	-		ug/kg	
Dibenzofuran	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
2,4-Dinitrotoluene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Diethylphthalate	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
4-Chlorophenyl-phenylether	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Fluorene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
4-Nitroaniline	-		ug/kg		-		ug/kg		1100	U	ug/kg	1100	-		ug/kg	
4,6-Dinitro-2-methylphenol	-		ug/kg		-		ug/kg		1100	U	ug/kg	1100	-		ug/kg	
N-Nitrosodiphenylamine	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
4-Bromophenyl-phenylether	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Hexachlorobenzene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Pentachlorophenol	-		ug/kg		-		ug/kg		1100	U	ug/kg	1100	-		ug/kg	
Phenanthrene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Anthracene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Carbazole	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Di-n-butylphthalate	-		ug/kg		-		ug/kg		430	UJ	ug/kg	430	-		ug/kg	
Fluoranthene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Pyrene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Butylbenzylphthalate	-		ug/kg		-		ug/kg		430	UJ	ug/kg	430	-		ug/kg	
3,3-Dichlorobenzidine	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Benzo (a) anthracene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Chrysene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
bis(2-Ethylhexyl) phthalate	-		ug/kg		-		ug/kg		430	UJ	ug/kg	430	-		ug/kg	

Lab Sample Number:	22898001				22898002				22898002				22898002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16SS0403				16SS0403A				16SS0403A				16SS0403A			
Collect Date:	05-OCT-93				11-SEP-92				05-OCT-92				05-OCT-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Benzo (b) fluoranthene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Benzo (k) fluoranthene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Benzo (a) pyrene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Indeno (1,2,3-cd) pyrene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Dibenzo (a,h) anthracene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
Benzo (g,h,i) perylene	-		ug/kg		-		ug/kg		430	U	ug/kg	430	-		ug/kg	
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	2.1	U	ug/kg	2.1	-		ug/kg		-		ug/kg		2.2	U	ug/kg	2.2
beta-BHC	2.1	U	ug/kg	2.1	-		ug/kg		-		ug/kg		2.2	U	ug/kg	2.2
delta-BHC	2.1	U	ug/kg	2.1	-		ug/kg		-		ug/kg		2.2	U	ug/kg	2.2
gamma-BHC (Lindane)	2.1	U	ug/kg	2.1	-		ug/kg		-		ug/kg		2.2	U	ug/kg	2.2
Heptachlor	2.1	U	ug/kg	2.1	-		ug/kg		-		ug/kg		2.2	U	ug/kg	2.2
Aldrin	2.1	U	ug/kg	2.1	-		ug/kg		-		ug/kg		2.2	U	ug/kg	2.2
Heptachlor epoxide	2.1	U	ug/kg	2.1	-		ug/kg		-		ug/kg		2.2	U	ug/kg	2.2
Endosulfan I	2.1	U	ug/kg	2.1	-		ug/kg		-		ug/kg		2.2	U	ug/kg	2.2
Dieldrin	4	U	ug/kg	4	-		ug/kg		-		ug/kg		4.3	U	ug/kg	4.3
4,4-DDE	4	U	ug/kg	4	-		ug/kg		-		ug/kg		4.3	U	ug/kg	4.3
Endrin	4	U	ug/kg	4	-		ug/kg		-		ug/kg		4.3	U	ug/kg	4.3
Endosulfan II	4	U	ug/kg	4	-		ug/kg		-		ug/kg		4.3	U	ug/kg	4.3
4,4-DDD	4	U	ug/kg	4	-		ug/kg		-		ug/kg		4.3	U	ug/kg	4.3
Endosulfan sulfate	4	U	ug/kg	4	-		ug/kg		-		ug/kg		4.3	U	ug/kg	4.3
4,4-DDT	4	U	ug/kg	4	-		ug/kg		-		ug/kg		4.3	U	ug/kg	4.3
Methoxychlor	21	U	ug/kg	21	-		ug/kg		-		ug/kg		22	U	ug/kg	22
Endrin ketone	4	U	ug/kg	4	-		ug/kg		-		ug/kg		4.3	U	ug/kg	4.3
Endrin aldehyde	4	U	ug/kg	4	-		ug/kg		-		ug/kg		4.3	U	ug/kg	4.3
alpha-Chlordane	2.1	U	ug/kg	2.1	-		ug/kg		-		ug/kg		2.2	U	ug/kg	2.2
gamma-Chlordane	2.1	U	ug/kg	2.1	-		ug/kg		-		ug/kg		2.2	U	ug/kg	2.2
Toxaphene	210	U	ug/kg	210	-		ug/kg		-		ug/kg		220	U	ug/kg	220
Aroclor-1016	40	U	ug/kg	40	-		ug/kg		-		ug/kg		43	U	ug/kg	43
Aroclor-1221	82	U	ug/kg	82	-		ug/kg		-		ug/kg		88	U	ug/kg	88
Aroclor-1232	40	U	ug/kg	40	-		ug/kg		-		ug/kg		43	U	ug/kg	43
Aroclor-1242	40	U	ug/kg	40	-		ug/kg		-		ug/kg		43	U	ug/kg	43
Aroclor-1248	40	U	ug/kg	40	-		ug/kg		-		ug/kg		43	U	ug/kg	43
Aroclor-1254	40	U	ug/kg	40	-		ug/kg		-		ug/kg		43	U	ug/kg	43
Aroclor-1260	40	U	ug/kg	40	-		ug/kg		-		ug/kg		43	U	ug/kg	43
CLP METALS AND CYANIDE mg/kg																
Aluminum	-		mg/kg		19500		mg/kg	40	-		mg/kg		-		mg/kg	
Antimony	-		mg/kg		2.6	UJ	mg/kg	12	-		mg/kg		-		mg/kg	
Arsenic	-		mg/kg		5.8	J	mg/kg	2	-		mg/kg		-		mg/kg	
Barium	-		mg/kg		19	J	mg/kg	40	-		mg/kg		-		mg/kg	
Beryllium	-		mg/kg		.29	J	mg/kg	1	-		mg/kg		-		mg/kg	
Cadmium	-		mg/kg		.73	U	mg/kg	1	-		mg/kg		-		mg/kg	
Calcium	-		mg/kg		542	UJ	mg/kg	1000	-		mg/kg		-		mg/kg	
Chromium	-		mg/kg		27.3	J	mg/kg	2	-		mg/kg		-		mg/kg	
Cobalt	-		mg/kg		1.4	J	mg/kg	10	-		mg/kg		-		mg/kg	
Copper	-		mg/kg		7.9		mg/kg	5	-		mg/kg		-		mg/kg	
Iron	-		mg/kg		17600		mg/kg	20	-		mg/kg		-		mg/kg	
Lead	-		mg/kg		14.6	J	mg/kg	1	-		mg/kg		-		mg/kg	
Magnesium	-		mg/kg		185	J	mg/kg	1000	-		mg/kg		-		mg/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 16 Subsurface Soil Data

Lab Sample Number:	22898001				22898002				22898002				22898002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16SS0403				16SS0403A				16SS0403A				16SS0403A			
Collect Date:	05-OCT-93				11-SEP-92				05-OCT-92				05-OCT-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	-		mg/kg		39.9		mg/kg	3	-		mg/kg		-		mg/kg	
Mercury	-		mg/kg		.1	UJ	mg/kg	.1	-		mg/kg		-		mg/kg	
Nickel	-		mg/kg		2.3	J	mg/kg	8	-		mg/kg		-		mg/kg	
Potassium	-		mg/kg		356	J	mg/kg	1000	-		mg/kg		-		mg/kg	
Selenium	-		mg/kg		.51	R	mg/kg	1	-		mg/kg		-		mg/kg	
Silver	-		mg/kg		.7	UJ	mg/kg	2	-		mg/kg		-		mg/kg	
Sodium	-		mg/kg		225	UJ	mg/kg	1000	-		mg/kg		-		mg/kg	
Thallium	-		mg/kg		.39	UJ	mg/kg	2	-		mg/kg		-		mg/kg	
Vanadium	-		mg/kg		67.5		mg/kg	10	-		mg/kg		-		mg/kg	
Zinc	-		mg/kg		28	J	mg/kg	4	-		mg/kg		-		mg/kg	
Cyanide	-		mg/kg		.1	R	mg/kg	1	-		mg/kg		-		mg/kg	
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	

Lab Sample Number:		22910001				22910004		
Site		WHITING				WHITING		
Locator		16-SS-06-04				16-SS-10-05		
Collect Date:		05-OCT-92				06-OCT-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/kg								
Chloromethane	12	U	ug/kg	12	11	U	ug/kg	11
Bromomethane	12	U	ug/kg	12	11	U	ug/kg	11
Vinyl chloride	12	U	ug/kg	12	11	U	ug/kg	11
Chloroethane	12	U	ug/kg	12	11	U	ug/kg	11
Methylene chloride	19	UJ	ug/kg	12	33	UJ	ug/kg	11
Acetone	87	J	ug/kg	12	11	UJ	ug/kg	11
Carbon disulfide	1	J	ug/kg	12	5	J	ug/kg	11
1,1-Dichloroethene	12	U	ug/kg	12	11	U	ug/kg	11
1,1-Dichloroethane	12	U	ug/kg	12	11	U	ug/kg	11
1,2-Dichloroethene (total)	12	U	ug/kg	12	11	U	ug/kg	11
Chloroform	12	U	ug/kg	12	11	U	ug/kg	11
1,2-Dichloroethane	12	U	ug/kg	12	11	U	ug/kg	11
2-Butanone	19		ug/kg	12	11	U	ug/kg	11
1,1,1-Trichloroethane	12	U	ug/kg	12	11	U	ug/kg	11
Carbon tetrachloride	12	U	ug/kg	12	11	U	ug/kg	11
Bromodichloromethane	12	U	ug/kg	12	11	U	ug/kg	11
1,2-Dichloropropane	12	U	ug/kg	12	11	U	ug/kg	11
cis-1,3-Dichloropropene	12	U	ug/kg	12	11	U	ug/kg	11
Trichloroethene	12	U	ug/kg	12	11	U	ug/kg	11
Dibromochloromethane	12	U	ug/kg	12	11	U	ug/kg	11
1,1,2-Trichloroethane	12	U	ug/kg	12	11	U	ug/kg	11
Benzene	12	U	ug/kg	12	11	U	ug/kg	11
trans-1,3-Dichloropropene	12	U	ug/kg	12	11	U	ug/kg	11
Bromoform	12	U	ug/kg	12	11	U	ug/kg	11
4-Methyl-2-pentanone	12	U	ug/kg	12	11	U	ug/kg	11
2-Hexanone	12	U	ug/kg	12	11	U	ug/kg	11
Tetrachloroethene	12	U	ug/kg	12	11	U	ug/kg	11
Toluene	12	U	ug/kg	12	11	U	ug/kg	11
1,1,2,2-Tetrachloroethane	12	U	ug/kg	12	11	U	ug/kg	11
Chlorobenzene	12	U	ug/kg	12	11	U	ug/kg	11
Ethylbenzene	12	U	ug/kg	12	11	U	ug/kg	11
Styrene	12	U	ug/kg	12	11	U	ug/kg	11
Xylenes (total)	2	J	ug/kg	12	4	J	ug/kg	11
CLP SEMIVOLATILES 90-SOW ug/kg								
Phenol	410	U	ug/kg	410	380	U	ug/kg	380
bis(2-Chloroethyl) ether	410	U	ug/kg	410	380	U	ug/kg	380
2-Chlorophenol	410	U	ug/kg	410	380	U	ug/kg	380
1,3-Dichlorobenzene	410	U	ug/kg	410	380	U	ug/kg	380
1,4-Dichlorobenzene	410	U	ug/kg	410	380	U	ug/kg	380

Naval Air Station Whiting Field, Milton, Florida
Site 16 Subsurface Soil Data

Lab Sample Number:	22910001				22910004			
Site	WHITING				WHITING			
Locator	16-SS-06-04				16-SS-10-05			
Collect Date:	05-OCT-92				06-OCT-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene	410	U	ug/kg	410	380	U	ug/kg	380
2-Methylphenol	410	U	ug/kg	410	380	U	ug/kg	380
2,2-oxybis(1-Chloropropane)	410	U	ug/kg	410	380	U	ug/kg	380
4-Methylphenol	410	U	ug/kg	410	380	U	ug/kg	380
N-Nitroso-di-n-propylamine	410	U	ug/kg	410	380	U	ug/kg	380
Hexachloroethane	410	U	ug/kg	410	380	U	ug/kg	380
Nitrobenzene	410	UJ	ug/kg	410	380	UJ	ug/kg	380
Isophorone	410	UJ	ug/kg	410	380	UJ	ug/kg	380
2-Nitrophenol	410	U	ug/kg	410	380	U	ug/kg	380
2,4-Dimethylphenol	410	U	ug/kg	410	380	U	ug/kg	380
bis(2-Chloroethoxy) methane	410	U	ug/kg	410	380	U	ug/kg	380
2,4-Dichlorophenol	410	U	ug/kg	410	380	U	ug/kg	380
1,2,4-Trichlorobenzene	410	U	ug/kg	410	380	U	ug/kg	380
Naphthalene	410	U	ug/kg	410	380	U	ug/kg	380
4-Chloroaniline	410	U	ug/kg	410	380	U	ug/kg	380
Hexachlorobutadiene	410	U	ug/kg	410	380	U	ug/kg	380
4-Chloro-3-methylphenol	410	U	ug/kg	410	380	U	ug/kg	380
2-Methylnaphthalene	410	U	ug/kg	410	380	U	ug/kg	380
Hexachlorocyclopentadiene	410	U	ug/kg	410	380	U	ug/kg	380
2,4,6-Trichlorophenol	410	U	ug/kg	410	380	U	ug/kg	380
2,4,5-Trichlorophenol	990	U	ug/kg	990	920	U	ug/kg	920
2-Chloronaphthalene	410	U	ug/kg	410	380	U	ug/kg	380
2-Nitroaniline	990	U	ug/kg	990	920	U	ug/kg	920
Dimethylphthalate	410	U	ug/kg	410	380	U	ug/kg	380
Acenaphthylene	410	U	ug/kg	410	380	U	ug/kg	380
2,6-Dinitrotoluene	410	UJ	ug/kg	410	380	UJ	ug/kg	380
3-Nitroaniline	990	U	ug/kg	990	920	U	ug/kg	920
Acenaphthene	77	J	ug/kg	410	380	U	ug/kg	380
2,4-Dinitrophenol	990	U	ug/kg	990	920	U	ug/kg	920
4-Nitrophenol	990	U	ug/kg	990	920	U	ug/kg	920
Dibenzofuran	410	U	ug/kg	410	380	U	ug/kg	380
2,4-Dinitrotoluene	410	UJ	ug/kg	410	380	UJ	ug/kg	380
Diethylphthalate	410	U	ug/kg	410	380	U	ug/kg	380
4-Chlorophenyl-phenylether	410	U	ug/kg	410	380	U	ug/kg	380
Fluorene	110	J	ug/kg	410	380	U	ug/kg	380
4-Nitroaniline	990	U	ug/kg	990	920	U	ug/kg	920
4,6-Dinitro-2-methylphenol	990	U	ug/kg	990	920	U	ug/kg	920
N-Nitrosodiphenylamine	410	U	ug/kg	410	380	U	ug/kg	380
4-Bromophenyl-phenylether	410	U	ug/kg	410	380	U	ug/kg	380
Hexachlorobenzene	410	U	ug/kg	410	380	U	ug/kg	380
Pentachlorophenol	990	U	ug/kg	990	920	U	ug/kg	920
Phenanthrene	340	J	ug/kg	410	380	U	ug/kg	380
Anthracene	410	U	ug/kg	410	380	U	ug/kg	380
Carbazole	410	U	ug/kg	410	380	U	ug/kg	380
Di-n-butylphthalate	410	UJ	ug/kg	410	380	UJ	ug/kg	380
Fluoranthene	270	J	ug/kg	410	380	U	ug/kg	380
Pyrene	190	J	ug/kg	410	380	U	ug/kg	380
Butylbenzylphthalate	410	U	ug/kg	410	380	U	ug/kg	380
3,3-Dichlorobenzidine	410	U	ug/kg	410	380	U	ug/kg	380
Benzo (a) anthracene	410	U	ug/kg	410	380	U	ug/kg	380
Chrysene	410	U	ug/kg	410	380	U	ug/kg	380
bis(2-Ethylhexyl) phthalate	150	J	ug/kg	410	39	J	ug/kg	380

Lab Sample Number:	22910001				22910004			
Site	WHITING				WHITING			
Locator	16-SS-06-04				16-SS-10-05			
Collect Date:	05-OCT-92				06-OCT-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	410	U	ug/kg	410	380	U	ug/kg	380
Benzo (b) fluoranthene	77	J	ug/kg	410	380	U	ug/kg	380
Benzo (k) fluoranthene	48	J	ug/kg	410	380	U	ug/kg	380
Benzo (a) pyrene	44	J	ug/kg	410	380	U	ug/kg	380
Indeno (1,2,3-cd) pyrene	410	U	ug/kg	410	380	U	ug/kg	380
Dibenzo (a,h) anthracene	410	U	ug/kg	410	380	U	ug/kg	380
Benzo (g,h,i) perylene	410	U	ug/kg	410	380	U	ug/kg	380
CLP PESTICIDES/PCBS 90-SOW ug/kg								
alpha-BHC	2.1	UJ	ug/kg	2.1	3.9	U	ug/kg	3.9
beta-BHC	2.1	UJ	ug/kg	2.1	3.9	U	ug/kg	3.9
delta-BHC	2.1	UJ	ug/kg	2.1	3.9	U	ug/kg	3.9
gamma-BHC (Lindane)	2.1	UJ	ug/kg	2.1	3.9	U	ug/kg	3.9
Heptachlor	2.1	UJ	ug/kg	2.1	3.9	U	ug/kg	3.9
Aldrin	2.1	UJ	ug/kg	2.1	3.9	U	ug/kg	3.9
Heptachlor epoxide	2.1	UJ	ug/kg	2.1	3.9	U	ug/kg	3.9
Endosulfan I	2.1	UJ	ug/kg	2.1	3.9	U	ug/kg	3.9
Dieldrin	4.1	UJ	ug/kg	4.1	7.6	U	ug/kg	7.6
4,4-DDE	30	J	ug/kg	4	83		ug/kg	8
Endrin	4.1	UJ	ug/kg	4.1	7.6	U	ug/kg	7.6
Endosulfan II	4.1	UJ	ug/kg	4.1	7.6	U	ug/kg	7.6
4,4-DDD	36	J	ug/kg	4	4.9	J	ug/kg	8
Endosulfan sulfate	4.1	UJ	ug/kg	4.1	7.6	U	ug/kg	7.6
4,4-DDT	5.7	J	ug/kg	4	52		ug/kg	8
Methoxychlor	21	UJ	ug/kg	21	39	U	ug/kg	39
Endrin ketone	4.1	UJ	ug/kg	4.1	7.6	U	ug/kg	7.6
Endrin aldehyde	4.1	UJ	ug/kg	4.1	7.6	U	ug/kg	7.6
alpha-Chlordane	2.1	UJ	ug/kg	2.1	3.9	U	ug/kg	3.9
gamma-Chlordane	2.1	UJ	ug/kg	2.1	3.9	U	ug/kg	3.9
Toxaphene	210	UJ	ug/kg	210	390	U	ug/kg	390
Aroclor-1016	41	UJ	ug/kg	41	76	U	ug/kg	76
Aroclor-1221	83	UJ	ug/kg	83	150	U	ug/kg	150
Aroclor-1232	41	UJ	ug/kg	41	76	U	ug/kg	76
Aroclor-1242	41	UJ	ug/kg	41	76	U	ug/kg	76
Aroclor-1248	41	UJ	ug/kg	41	76	U	ug/kg	76
Aroclor-1254	41	UJ	ug/kg	41	76	U	ug/kg	76
Aroclor-1260	41	UJ	ug/kg	41	76	U	ug/kg	76
CLP METALS AND CYANIDE mg/kg								
Aluminum	11000		mg/kg	40	17300		mg/kg	40
Antimony	6.7	J	mg/kg	12	5.9	J	mg/kg	12
Arsenic	15.1		mg/kg	2	11		mg/kg	2
Barium	175		mg/kg	40	122		mg/kg	40
Beryllium	.19	J	mg/kg	1	.19	J	mg/kg	1
Cadmium	9		mg/kg	1	8.7		mg/kg	1
Calcium	5870		mg/kg	1000	1370		mg/kg	1000
Chromium	24.7		mg/kg	2	36.9		mg/kg	2
Cobalt	4.5	J	mg/kg	10	9.6	J	mg/kg	10
Copper	143		mg/kg	5	3620		mg/kg	5
Iron	37500		mg/kg	20	74800		mg/kg	20
Lead	766		mg/kg	1	567		mg/kg	1
Magnesium	586	J	mg/kg	1000	400	J	mg/kg	1000

Naval Air Station Whiting Field, Milton, Florida
Site 16 Subsurface Soil Data

Lab Sample Number:	22910001				22910004			
Site	WHITING				WHITING			
Locator	16-SS-06-04				16-SS-10-05			
Collect Date:	05-OCT-92				06-OCT-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	297		mg/kg	3	638		mg/kg	3
Mercury	.25	J	mg/kg	.1	.17	J	mg/kg	.1
Nickel	24.3		mg/kg	8	35.9		mg/kg	8
Potassium	412	J	mg/kg	1000	166	J	mg/kg	1000
Selenium	.55	U	mg/kg	1	.48	U	mg/kg	1
Silver	4.3		mg/kg	2	3.4		mg/kg	2
Sodium	514	J	mg/kg	1000	332	J	mg/kg	1000
Thallium	.42	U	mg/kg	2	.37	U	mg/kg	2
Vanadium	19		mg/kg	10	27.9		mg/kg	10
Zinc	518		mg/kg	4	895		mg/kg	4
Cyanide	.11	U	mg/kg	1	.14	J	mg/kg	1
Total organic carbon	-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		-		mg/kg	

Lab Sample Number:			S22454002				22454002				S22454003				22454003		
Site			WHITING				WHITING				WHITING				WHITING		
Locator			16-SL-01				16-SL-01				16-SL-02				16-SL-02		
Collect Date:			11-AUG-92				11-AUG-92				11-AUG-92				11-AUG-92		
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/kg																
Chloromethane		-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Bromomethane		-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Vinyl chloride		-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Chloroethane		-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Methylene chloride		-		ug/kg		11	UJ	ug/kg	6	-		ug/kg		6	UJ	ug/kg	6
Acetone		-		ug/kg		11	U	ug/kg	11	-		ug/kg		15	UJ	ug/kg	11
Carbon disulfide		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
1,1-Dichloroethene		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
1,1-Dichloroethane		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
1,2-Dichloroethene (total)		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
Chloroform		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
1,2-Dichloroethane		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
2-Butanone		-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
1,1,1-Trichloroethane		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
Carbon tetrachloride		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
Bromodichloromethane		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
1,2-Dichloropropane		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
cis-1,3-Dichloropropene		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
Trichloroethene		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
Dibromochloromethane		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
1,1,2-Trichloroethane		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
Benzene		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
trans-1,3-Dichloropropene		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
Bromoform		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
4-Methyl-2-pentanone		-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
2-Hexanone		-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Tetrachloroethene		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
Toluene		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
1,1,2,2-Tetrachloroethane		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
Chlorobenzene		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
Ethylbenzene		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
Styrene		-		ug/kg		6	U	ug/kg	6	-		ug/kg		6	U	ug/kg	6
Xylenes (total)		-		ug/kg		5	J	ug/kg	6	-		ug/kg		2	J	ug/kg	6
CLP SEMIVOLATILES 90-SOW	ug/kg																
Phenol		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380
bis(2-Chloroethyl) ether		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380
2-Chlorophenol		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380
1,3-Dichlorobenzene		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380
1,4-Dichlorobenzene		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380
1,2-Dichlorobenzene		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380
2-Methylphenol		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380
2,2-oxybis(1-Chloropropane)		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380
4-Methylphenol		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380
N-Nitroso-di-n-propylamine		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380
Hexachloroethane		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380
Nitrobenzene		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380
Isophorone		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380
2-Nitrophenol		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380
2,4-Dimethylphenol		-		ug/kg		370	U	ug/kg	370	-		ug/kg		380	U	ug/kg	380

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	S22454002				22454002				S22454003				22454003			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16-SL-01				16-SL-01				16-SL-02				16-SL-02			
Collect Date:	11-AUG-92				11-AUG-92				11-AUG-92				11-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
bis(2-Chloroethoxy) methane		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
2,4-Dichlorophenol		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
1,2,4-Trichlorobenzene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Naphthalene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
4-Chloroaniline		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Hexachlorobutadiene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
4-Chloro-3-methylphenol		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
2-Methylnaphthalene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Hexachlorocyclopentadiene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
2,4,6-Trichlorophenol		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
2,4,5-Trichlorophenol		-	ug/kg		1800	U	ug/kg	1800		-	ug/kg		1800	U	ug/kg	1800
2-Chloronaphthalene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
2-Nitroaniline		-	ug/kg		1800	U	ug/kg	1800		-	ug/kg		1800	UJ	ug/kg	1800
Dimethylphthalate		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Acenaphthylene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
2,6-Dinitrotoluene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
3-Nitroaniline		-	ug/kg		1800	U	ug/kg	1800		-	ug/kg		1800	UJ	ug/kg	1800
Acenaphthene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
2,4-Dinitrophenol		-	ug/kg		1800	U	ug/kg	1800		-	ug/kg		1800	U	ug/kg	1800
4-Nitrophenol		-	ug/kg		1800	U	ug/kg	1800		-	ug/kg		1800	UJ	ug/kg	1800
Dibenzofuran		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
2,4-Dinitrotoluene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Diethylphthalate		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
4-Chlorophenyl-phenylether		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Fluorene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
4-Nitroaniline		-	ug/kg		1800	UJ	ug/kg	1800		-	ug/kg		1800	UJ	ug/kg	1800
4,6-Dinitro-2-methylphenol		-	ug/kg		1800	U	ug/kg	1800		-	ug/kg		1800	U	ug/kg	1800
N-Nitrosodiphenylamine		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
4-Bromophenyl-phenylether		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Hexachlorobenzene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Pentachlorophenol		-	ug/kg		1800	U	ug/kg	1800		-	ug/kg		1800	U	ug/kg	1800
Phenanthrene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Anthracene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Carbazole		-	ug/kg		-		ug/kg			-	ug/kg		-		ug/kg	
Di-n-butylphthalate		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	UJ	ug/kg	380
Fluoranthene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Pyrene		-	ug/kg		370	UJ	ug/kg	370		-	ug/kg		380	UJ	ug/kg	380
Butylbenzylphthalate		-	ug/kg		370	UJ	ug/kg	370		-	ug/kg		380	UJ	ug/kg	380
3,3-Dichlorobenzidine		-	ug/kg		730	U	ug/kg	730		-	ug/kg		760	U	ug/kg	760
Benzo (a) anthracene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Chrysene		-	ug/kg		370	UJ	ug/kg	370		-	ug/kg		380	UJ	ug/kg	380
bis(2-Ethylhexyl) phthalate		-	ug/kg		370	UJ	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Di-n-octylphthalate		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Benzo (b) fluoranthene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Benzo (k) fluoranthene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Benzo (a) pyrene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Indeno (1,2,3-cd) pyrene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Dibenzo (a,h) anthracene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
Benzo (g,h,i) perylene		-	ug/kg		370	U	ug/kg	370		-	ug/kg		380	U	ug/kg	380
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC		-	ug/kg		8.9	U	ug/kg	8.9		-	ug/kg		9.2	U	ug/kg	9.2

Lab Sample Number:			S22454002				22454002				S22454003				22454003	
Site			WHITING				WHITING				WHITING				WHITING	
Locator			16-SL-01				16-SL-01				16-SL-02				16-SL-02	
Collect Date:			11-AUG-92				11-AUG-92				11-AUG-92				11-AUG-92	
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
beta-BHC	-		ug/kg		8.9	U	ug/kg	8.9	-		ug/kg		9.2	U	ug/kg	9.2
delta-BHC	-		ug/kg		8.9	U	ug/kg	8.9	-		ug/kg		9.2	U	ug/kg	9.2
gamma-BHC (Lindane)	-		ug/kg		8.9	U	ug/kg	8.9	-		ug/kg		9.2	U	ug/kg	9.2
Heptachlor	-		ug/kg		8.9	U	ug/kg	8.9	-		ug/kg		9.2	U	ug/kg	9.2
Aldrin	-		ug/kg		8.9	U	ug/kg	8.9	-		ug/kg		9.2	U	ug/kg	9.2
Heptachlor epoxide	-		ug/kg		8.9	U	ug/kg	8.9	-		ug/kg		9.2	U	ug/kg	9.2
Endosulfan I	-		ug/kg		8.9	U	ug/kg	8.9	-		ug/kg		9.2	U	ug/kg	9.2
Dieldrin	-		ug/kg		33		ug/kg	18	-		ug/kg		18	U	ug/kg	18
4,4-DDE	-		ug/kg		18	U	ug/kg	18	-		ug/kg		5.5	J	ug/kg	18
Endrin	-		ug/kg		18	U	ug/kg	18	-		ug/kg		18	U	ug/kg	18
Endosulfan II	-		ug/kg		18	U	ug/kg	18	-		ug/kg		18	U	ug/kg	18
4,4-DDD	-		ug/kg		18	U	ug/kg	18	-		ug/kg		18	U	ug/kg	18
Endosulfan sulfate	-		ug/kg		18	U	ug/kg	18	-		ug/kg		18	U	ug/kg	18
4,4-DDT	-		ug/kg		18	U	ug/kg	18	-		ug/kg		9.1	J	ug/kg	18
Methoxychlor	-		ug/kg		89	U	ug/kg	89	-		ug/kg		92	U	ug/kg	92
Endrin ketone	-		ug/kg		18	U	ug/kg	18	-		ug/kg		18	U	ug/kg	18
Endrin aldehyde	-		ug/kg		-		ug/kg		-		ug/kg		-		ug/kg	
alpha-Chlordane	-		ug/kg		89	U	ug/kg	89	-		ug/kg		92	U	ug/kg	92
gamma-Chlordane	-		ug/kg		89	U	ug/kg	89	-		ug/kg		92	U	ug/kg	92
Toxaphene	-		ug/kg		180	U	ug/kg	180	-		ug/kg		180	U	ug/kg	180
Aroclor-1016	-		ug/kg		89	U	ug/kg	89	-		ug/kg		92	U	ug/kg	92
Aroclor-1221	-		ug/kg		89	U	ug/kg	89	-		ug/kg		92	U	ug/kg	92
Aroclor-1232	-		ug/kg		89	U	ug/kg	89	-		ug/kg		92	U	ug/kg	92
Aroclor-1242	-		ug/kg		89	U	ug/kg	89	-		ug/kg		92	U	ug/kg	92
Aroclor-1248	-		ug/kg		89	U	ug/kg	89	-		ug/kg		92	U	ug/kg	92
Aroclor-1254	-		ug/kg		180	U	ug/kg	180	-		ug/kg		180	U	ug/kg	180
Aroclor-1260	-		ug/kg		180	U	ug/kg	180	-		ug/kg		180	U	ug/kg	180
CLP METALS AND CYANIDE mg/kg																
Aluminum	10900		mg/kg	40	-		mg/kg		18600		mg/kg	40	-		mg/kg	
Antimony	2.8	U	mg/kg	12	-		mg/kg		2.7	U	mg/kg	12	-		mg/kg	
Arsenic	1.9	J	mg/kg	2	-		mg/kg		1.4	J	mg/kg	2	-		mg/kg	
Barium	19.4	J	mg/kg	40	-		mg/kg		14.7	J	mg/kg	40	-		mg/kg	
Beryllium	.12	J	mg/kg	1	-		mg/kg		.12	J	mg/kg	1	-		mg/kg	
Cadmium	.63	U	mg/kg	1	-		mg/kg		.61	U	mg/kg	1	-		mg/kg	
Calcium	427	J	mg/kg	1000	-		mg/kg		345	J	mg/kg	1000	-		mg/kg	
Chromium	10.5		mg/kg	2	-		mg/kg		14.7		mg/kg	2	-		mg/kg	
Cobalt	1.3	J	mg/kg	10	-		mg/kg		.95	J	mg/kg	10	-		mg/kg	
Copper	9.7		mg/kg	5	-		mg/kg		8.3		mg/kg	5	-		mg/kg	
Iron	6300		mg/kg	20	-		mg/kg		8150		mg/kg	20	-		mg/kg	
Lead	76		mg/kg	1	-		mg/kg		6.7	J	mg/kg	1	-		mg/kg	
Magnesium	106	J	mg/kg	1000	-		mg/kg		134	J	mg/kg	1000	-		mg/kg	
Manganese	80.3		mg/kg	3	-		mg/kg		19.2		mg/kg	3	-		mg/kg	
Mercury	.08	U	mg/kg	.1	-		mg/kg		.08	U	mg/kg	.1	-		mg/kg	
Nickel	2.4	U	mg/kg	8	-		mg/kg		2.4	U	mg/kg	8	-		mg/kg	
Potassium	137	U	mg/kg	1000	-		mg/kg		133	U	mg/kg	1000	-		mg/kg	
Selenium	.42	U	mg/kg	1	-		mg/kg		.41	U	mg/kg	1	-		mg/kg	
Silver	.34	U	mg/kg	2	-		mg/kg		.33	U	mg/kg	2	-		mg/kg	
Sodium	196	J	mg/kg	1000	-		mg/kg		189	J	mg/kg	1000	-		mg/kg	
Thallium	.47	U	mg/kg	2	-		mg/kg		.46	U	mg/kg	2	-		mg/kg	
Vanadium	23.2		mg/kg	10	-		mg/kg		28.9		mg/kg	10	-		mg/kg	
Zinc	22.7		mg/kg	4	-		mg/kg		12.5		mg/kg	4	-		mg/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	S22454002				22454002				S22454003				22454003			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16-SL-01				16-SL-01				16-SL-02				16-SL-02			
Collect Date:	11-AUG-92				11-AUG-92				11-AUG-92				11-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Cyanide	.25	U	mg/kg	1	-		mg/kg		.24	U	mg/kg	1	-		mg/kg	
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:		S22454004				22454004				RA856001				RA856018		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16-SL-03				16-SL-03				16S00101				16S00101D		
Collect Date:		11-AUG-92				11-AUG-92				08-JAN-96				08-JAN-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/kg																
Chloromethane	-		ug/kg		12	U	ug/kg	12	12	U	ug/kg	12	12	UJ	ug/kg	12
Bromomethane	-		ug/kg		12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Vinyl chloride	-		ug/kg		12	U	ug/kg	12	12	U	ug/kg	12	12	UJ	ug/kg	12
Chloroethane	-		ug/kg		12	U	ug/kg	12	12	UJ	ug/kg	12	12	UJ	ug/kg	12
Methylene chloride	-		ug/kg		10	UJ	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
Acetone	-		ug/kg		12	U	ug/kg	12	12	UJ	ug/kg	12	12	UJ	ug/kg	12
Carbon disulfide	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	UJ	ug/kg	12
1,1-Dichloroethene	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
1,1-Dichloroethane	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
1,2-Dichloroethene (total)	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
Chloroform	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
1,2-Dichloroethane	-		ug/kg		6	U	ug/kg	6	12	UJ	ug/kg	12	12	U	ug/kg	12
2-Butanone	-		ug/kg		12	U	ug/kg	12	12	UJ	ug/kg	12	12	U	ug/kg	12
1,1,1-Trichloroethane	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
Carbon tetrachloride	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
Bromodichloromethane	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
1,2-Dichloropropane	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
cis-1,3-Dichloropropene	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
Trichloroethene	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
Dibromochloromethane	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
1,1,2-Trichloroethane	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
Benzene	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
trans-1,3-Dichloropropene	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
Bromoform	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
4-Methyl-2-pentanone	-		ug/kg		12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
2-Hexanone	-		ug/kg		12	U	ug/kg	12	12	U	ug/kg	12	12	UJ	ug/kg	12
Tetrachloroethene	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
Toluene	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
1,1,2,2-Tetrachloroethane	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
Chlorobenzene	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
Ethylbenzene	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
Styrene	-		ug/kg		6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
Xylenes (total)	-		ug/kg		1	J	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12
CLP SEMIVOLATILES 90-SOW ug/kg																
Phenol	-		ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
bis(2-Chloroethyl) ether	-		ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
2-Chlorophenol	-		ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
1,3-Dichlorobenzene	-		ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
1,4-Dichlorobenzene	-		ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:		S22454004				22454004				RA856001				RA856018		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16-SL-03				16-SL-03				16S00101				16S00101D		
Collect Date:		11-AUG-92				11-AUG-92				08-JAN-96				08-JAN-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
2-Methylphenol		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
2,2-oxybis(1-Chloropropane)		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
4-Methylphenol		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
N-Nitroso-di-n-propylamine		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Hexachloroethane		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Nitrobenzene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Isophorone		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
2-Nitrophenol		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
2,4-Dimethylphenol		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
bis(2-Chloroethoxy) methane		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
2,4-Dichlorophenol		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
1,2,4-Trichlorobenzene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Naphthalene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
4-Chloroaniline		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Hexachlorobutadiene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
4-Chloro-3-methylphenol		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
2-Methylnaphthalene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Hexachlorocyclopentadiene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
2,4,6-Trichlorophenol		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
2,4,5-Trichlorophenol		-	ug/kg		2000	U	ug/kg	2000	980	U	ug/kg	980	970	U	ug/kg	970
2-Chloronaphthalene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
2-Nitroaniline		-	ug/kg		2000	UJ	ug/kg	2000	980	U	ug/kg	980	970	U	ug/kg	970
Dimethylphthalate		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Acenaphthylene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
2,6-Dinitrotoluene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
3-Nitroaniline		-	ug/kg		2000	UJ	ug/kg	2000	980	U	ug/kg	980	970	U	ug/kg	970
Acenaphthene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
2,4-Dinitrophenol		-	ug/kg		2000	U	ug/kg	2000	980	U	ug/kg	980	970	U	ug/kg	970
4-Nitrophenol		-	ug/kg		2000	UJ	ug/kg	2000	980	U	ug/kg	980	970	U	ug/kg	970
Dibenzofuran		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
2,4-Dinitrotoluene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Diethylphthalate		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
4-Chlorophenyl-phenylether		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Fluorene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
4-Nitroaniline		-	ug/kg		2000	UJ	ug/kg	2000	980	U	ug/kg	980	970	U	ug/kg	970
4,6-Dinitro-2-methylphenol		-	ug/kg		2000	U	ug/kg	2000	980	U	ug/kg	980	970	U	ug/kg	970
N-Nitrosodiphenylamine		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
4-Bromophenyl-phenylether		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Hexachlorobenzene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Pentachlorophenol		-	ug/kg		2000	U	ug/kg	2000	980	U	ug/kg	980	970	U	ug/kg	970
Phenanthrene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Anthracene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Carbazole		-	ug/kg		-		ug/kg		390	U	ug/kg	390	380	U	ug/kg	380
Di-n-butylphthalate		-	ug/kg		410	UJ	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Fluoranthene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Pyrene		-	ug/kg		410	UJ	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Butylbenzylphthalate		-	ug/kg		410	UJ	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
3,3-Dichlorobenzidine		-	ug/kg		820	U	ug/kg	820	390	U	ug/kg	390	380	U	ug/kg	380
Benzo (a) anthracene		-	ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Chrysene		-	ug/kg		410	UJ	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
bis(2-Ethylhexyl) phthalate		-	ug/kg		43	J	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Lab Sample Number:		S22454004				22454004				RA856001				RA856018		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16-SL-03				16-SL-03				16S00101				16S00101D		
Collect Date:		11-AUG-92				11-AUG-92				08-JAN-96				08-JAN-96		
Di-n-octylphthalate	-		ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Benzo (b) fluoranthene	-		ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Benzo (k) fluoranthene	-		ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Benzo (a) pyrene	-		ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Indeno (1,2,3-cd) pyrene	-		ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Dibenzo (a,h) anthracene	-		ug/kg		410	U	ug/kg	410	390	U	ug/kg	390	380	U	ug/kg	380
Benzo (g,h,i) perylene	-		ug/kg		410	U	ug/kg	410	390	UJ	ug/kg	390	380	U	ug/kg	380
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	-		ug/kg		9.9	U	ug/kg	9.9	2	U	ug/kg	2	-		ug/kg	
beta-BHC	-		ug/kg		9.9	U	ug/kg	9.9	2	U	ug/kg	2	-		ug/kg	
delta-BHC	-		ug/kg		9.9	U	ug/kg	9.9	2	U	ug/kg	2	-		ug/kg	
gamma-BHC (Lindane)	-		ug/kg		9.9	U	ug/kg	9.9	2	U	ug/kg	2	-		ug/kg	
Heptachlor	-		ug/kg		9.9	U	ug/kg	9.9	2	U	ug/kg	2	-		ug/kg	
Aldrin	-		ug/kg		9.9	U	ug/kg	9.9	2	U	ug/kg	2	-		ug/kg	
Heptachlor epoxide	-		ug/kg		9.9	U	ug/kg	9.9	2	U	ug/kg	2	-		ug/kg	
Endosulfan I	-		ug/kg		9.9	U	ug/kg	9.9	2	U	ug/kg	2	-		ug/kg	
Dieldrin	-		ug/kg		20	U	ug/kg	20	3.9	U	ug/kg	3.9	-		ug/kg	
4,4-DDE	-		ug/kg		5.5	J	ug/kg	20	3.2	J	ug/kg	4	-		ug/kg	
Endrin	-		ug/kg		20	U	ug/kg	20	3.9	U	ug/kg	3.9	-		ug/kg	
Endosulfan II	-		ug/kg		20	U	ug/kg	20	3.9	U	ug/kg	3.9	-		ug/kg	
4,4-DDD	-		ug/kg		20	U	ug/kg	20	3.9	U	ug/kg	3.9	-		ug/kg	
Endosulfan sulfate	-		ug/kg		20	U	ug/kg	20	3.9	UJ	ug/kg	3.9	-		ug/kg	
4,4-DDT	-		ug/kg		5.2	J	ug/kg	20	3.8	J	ug/kg	4	-		ug/kg	
Methoxychlor	-		ug/kg		99	U	ug/kg	99	20	U	ug/kg	20	-		ug/kg	
Endrin ketone	-		ug/kg		20	U	ug/kg	20	3.9	U	ug/kg	3.9	-		ug/kg	
Endrin aldehyde	-		ug/kg		-		ug/kg		3.9	U	ug/kg	3.9	-		ug/kg	
alpha-Chlordane	-		ug/kg		99	U	ug/kg	99	2	U	ug/kg	2	-		ug/kg	
gamma-Chlordane	-		ug/kg		99	U	ug/kg	99	2	U	ug/kg	2	-		ug/kg	
Toxaphene	-		ug/kg		200	U	ug/kg	200	200	U	ug/kg	200	-		ug/kg	
Aroclor-1016	-		ug/kg		99	U	ug/kg	99	39	U	ug/kg	39	-		ug/kg	
Aroclor-1221	-		ug/kg		99	U	ug/kg	99	79	U	ug/kg	79	-		ug/kg	
Aroclor-1232	-		ug/kg		99	U	ug/kg	99	39	U	ug/kg	39	-		ug/kg	
Aroclor-1242	-		ug/kg		99	U	ug/kg	99	39	U	ug/kg	39	-		ug/kg	
Aroclor-1248	-		ug/kg		99	U	ug/kg	99	39	U	ug/kg	39	-		ug/kg	
Aroclor-1254	-		ug/kg		200	U	ug/kg	200	39	U	ug/kg	39	-		ug/kg	
Aroclor-1260	-		ug/kg		200	U	ug/kg	200	39	U	ug/kg	39	-		ug/kg	
CLP METALS AND CYANIDE mg/kg																
Aluminum	14200		mg/kg	40	-		mg/kg		4250	J	mg/kg	40	5840	J	mg/kg	40
Antimony	3	U	mg/kg	12	-		mg/kg		12	UJ	mg/kg	12	12	UJ	mg/kg	12
Arsenic	3.1		mg/kg	2	-		mg/kg		.94	J	mg/kg	2	1.2	J	mg/kg	2
Barium	42.9	J	mg/kg	40	-		mg/kg		13.2	J	mg/kg	40	13.6	J	mg/kg	40
Beryllium	.12	J	mg/kg	1	-		mg/kg		.09	J	mg/kg	1	1	U	mg/kg	1
Cadmium	1.6		mg/kg	1	-		mg/kg		.28	J	mg/kg	1	.3	J	mg/kg	1
Calcium	1180	J	mg/kg	1000	-		mg/kg		210	J	mg/kg	1000	173	J	mg/kg	1000
Chromium	14.9		mg/kg	2	-		mg/kg		4		mg/kg	2	5.8		mg/kg	2
Cobalt	1.7	J	mg/kg	10	-		mg/kg		10	U	mg/kg	10	10	U	mg/kg	10
Copper	50.8		mg/kg	5	-		mg/kg		4.8	J	mg/kg	5	5	UJ	mg/kg	5
Iron	13600		mg/kg	20	-		mg/kg		2340	J	mg/kg	20	2910	J	mg/kg	20
Lead	121		mg/kg	1	-		mg/kg		7.8	J	mg/kg	.6	7.5	J	mg/kg	.6
Magnesium	228	J	mg/kg	1000	-		mg/kg		103	J	mg/kg	1000	150	J	mg/kg	1000

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	S22454004				22454004				RA856001				RA856018			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16-SL-03				16-SL-03				16S00101				16S00101D			
Collect Date:	11-AUG-92				11-AUG-92				08-JAN-96				08-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	228		mg/kg	3	-		mg/kg		185		mg/kg	3	151		mg/kg	3
Mercury	.1		mg/kg	.1	-		mg/kg		.1	U	mg/kg	.1	.1	U	mg/kg	.1
Nickel	5.5	J	mg/kg	8	-		mg/kg		8	U	mg/kg	8	1.9	J	mg/kg	8
Potassium	230	J	mg/kg	1000	-		mg/kg		1000	UJ	mg/kg	1000	1000	UJ	mg/kg	1000
Selenium	.46	U	mg/kg	1	-		mg/kg		.19	J	mg/kg	1	1	U	mg/kg	1
Silver	.87	J	mg/kg	2	-		mg/kg		2	U	mg/kg	2	2	U	mg/kg	2
Sodium	232	J	mg/kg	1000	-		mg/kg		129	J	mg/kg	1000	1000	UJ	mg/kg	1000
Thallium	.5	U	mg/kg	2	-		mg/kg		2	U	mg/kg	2	2	U	mg/kg	2
Vanadium	22.7		mg/kg	10	-		mg/kg		6.8	J	mg/kg	10	8.6	J	mg/kg	10
Zinc	128		mg/kg	4	-		mg/kg		6.4		mg/kg	4	6.9		mg/kg	4
Cyanide	.27	U	mg/kg	1	-		mg/kg		.12	J	mg/kg	.5	.12	J	mg/kg	.5
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	

Lab Sample Number:		RA856018				RA856006				RA856007				RA856003		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16S00101D				16S00201				16S00301				16S00401		
Collect Date:		09-JAN-96				09-JAN-96				09-JAN-96				08-JAN-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/kg																
Chloromethane		-	ug/kg		11	U	ug/kg	11	13	UJ	ug/kg	13	11	U	ug/kg	11
Bromomethane		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Vinyl chloride		-	ug/kg		11	U	ug/kg	11	13	UJ	ug/kg	13	11	U	ug/kg	11
Chloroethane		-	ug/kg		11	UJ	ug/kg	11	13	U	ug/kg	13	11	UJ	ug/kg	11
Methylene chloride		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Acetone		-	ug/kg		11	UJ	ug/kg	11	13	UJ	ug/kg	13	11	UJ	ug/kg	11
Carbon disulfide		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
1,1-Dichloroethene		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
1,1-Dichloroethane		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
1,2-Dichloroethene (total)		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Chloroform		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
1,2-Dichloroethane		-	ug/kg		11	UJ	ug/kg	11	13	UJ	ug/kg	13	11	UJ	ug/kg	11
2-Butanone		-	ug/kg		11	UJ	ug/kg	11	13	UJ	ug/kg	13	11	UJ	ug/kg	11
1,1,1-Trichloroethane		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Carbon tetrachloride		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Bromodichloromethane		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
1,2-Dichloropropane		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
cis-1,3-Dichloropropene		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Trichloroethene		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Dibromochloromethane		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
1,1,2-Trichloroethane		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Benzene		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
trans-1,3-Dichloropropene		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Bromoform		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
4-Methyl-2-pentanone		-	ug/kg		11	U	ug/kg	11	13	UJ	ug/kg	13	11	U	ug/kg	11
2-Hexanone		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Tetrachloroethene		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Toluene		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
1,1,2,2-Tetrachloroethane		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Chlorobenzene		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Ethylbenzene		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Styrene		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
Xylenes (total)		-	ug/kg		11	U	ug/kg	11	13	U	ug/kg	13	11	U	ug/kg	11
CLP SEMIVOLATILES 90-SOW ug/kg																
Phenol		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
bis(2-Chloroethyl) ether		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
2-Chlorophenol		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
1,3-Dichlorobenzene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
1,4-Dichlorobenzene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA856018				RA856006				RA856007				RA856003			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16S00101D				16S00201				16S00301				16S00401			
Collect Date:	09-JAN-96				09-JAN-96				09-JAN-96				08-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
2-Methylphenol		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
2,2-oxybis(1-Chloropropane)		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
4-Methylphenol		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
N-Nitroso-di-n-propylamine		-	ug/kg		370	U	ug/kg	370	420	UJ	ug/kg	420	370	U	ug/kg	370
Hexachloroethane		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Nitrobenzene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Isophorone		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
2-Nitrophenol		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
2,4-Dimethylphenol		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
bis(2-Chloroethoxy) methane		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
2,4-Dichlorophenol		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
1,2,4-Trichlorobenzene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Naphthalene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
4-Chloroaniline		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Hexachlorobutadiene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
4-Chloro-3-methylphenol		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
2-Methylnaphthalene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Hexachlorocyclopentadiene		-	ug/kg		370	U	ug/kg	370	420	UJ	ug/kg	420	370	U	ug/kg	370
2,4,6-Trichlorophenol		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
2,4,5-Trichlorophenol		-	ug/kg		920	U	ug/kg	920	1100	U	ug/kg	1100	920	U	ug/kg	920
2-Chloronaphthalene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
2-Nitroaniline		-	ug/kg		920	U	ug/kg	920	1100	U	ug/kg	1100	920	U	ug/kg	920
Dimethylphthalate		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Acenaphthylene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
2,6-Dinitrotoluene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
3-Nitroaniline		-	ug/kg		920	U	ug/kg	920	1100	U	ug/kg	1100	920	U	ug/kg	920
Acenaphthene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
2,4-Dinitrophenol		-	ug/kg		920	U	ug/kg	920	1100	U	ug/kg	1100	920	U	ug/kg	920
4-Nitrophenol		-	ug/kg		920	U	ug/kg	920	1100	U	ug/kg	1100	920	U	ug/kg	920
Dibenzofuran		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
2,4-Dinitrotoluene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Diethylphthalate		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
4-Chlorophenyl-phenylether		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Fluorene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
4-Nitroaniline		-	ug/kg		920	U	ug/kg	920	1100	U	ug/kg	1100	920	U	ug/kg	920
4,6-Dinitro-2-methylphenol		-	ug/kg		920	U	ug/kg	920	1100	U	ug/kg	1100	920	U	ug/kg	920
N-Nitrosodiphenylamine		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
4-Bromophenyl-phenylether		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Hexachlorobenzene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Pentachlorophenol		-	ug/kg		920	U	ug/kg	920	1100	U	ug/kg	1100	920	U	ug/kg	920
Phenanthrene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Anthracene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Carbazole		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Di-n-butylphthalate		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Fluoranthene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Pyrene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Butylbenzylphthalate		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
3,3-Dichlorobenzidine		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Benzo (a) anthracene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Chrysene		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
bis(2-Ethylhexyl) phthalate		-	ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA856018				RA856006				RA856007				RA856003			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16S00101D				16S00201				16S00301				16S00401			
Collect Date:	09-JAN-96				09-JAN-96				09-JAN-96				08-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	-		ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Benzo (b) fluoranthene	-		ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Benzo (k) fluoranthene	-		ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Benzo (a) pyrene	-		ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Indeno (1,2,3-cd) pyrene	-		ug/kg		370	U	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Dibenzo (a,h) anthracene	-		ug/kg		370	UJ	ug/kg	370	420	U	ug/kg	420	370	U	ug/kg	370
Benzo (g,h,i) perylene	-		ug/kg		370	UJ	ug/kg	370	420	U	ug/kg	420	370	UJ	ug/kg	370
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	2	UJ	ug/kg	2	1.9	U	ug/kg	1.9	2.2	UJ	ug/kg	2.2	1.9	U	ug/kg	1.9
beta-BHC	2	UJ	ug/kg	2	1.9	U	ug/kg	1.9	2.2	UJ	ug/kg	2.2	1.9	U	ug/kg	1.9
delta-BHC	2	UJ	ug/kg	2	1.9	U	ug/kg	1.9	2.2	UJ	ug/kg	2.2	1.9	U	ug/kg	1.9
gamma-BHC (Lindane)	2	UJ	ug/kg	2	1.9	U	ug/kg	1.9	2.2	UJ	ug/kg	2.2	1.9	U	ug/kg	1.9
Heptachlor	2	UJ	ug/kg	2	1.9	U	ug/kg	1.9	2.2	UJ	ug/kg	2.2	1.9	U	ug/kg	1.9
Aldrin	2	UJ	ug/kg	2	1.9	U	ug/kg	1.9	2.2	UJ	ug/kg	2.2	1.9	U	ug/kg	1.9
Heptachlor epoxide	2	UJ	ug/kg	2	1.9	U	ug/kg	1.9	2.2	UJ	ug/kg	2.2	1.9	U	ug/kg	1.9
Endosulfan I	2	UJ	ug/kg	2	1.9	U	ug/kg	1.9	2.2	UJ	ug/kg	2.2	1.9	U	ug/kg	1.9
Dieldrin	3.8	UJ	ug/kg	3.8	3.7	U	ug/kg	3.7	2.5	J	ug/kg	4	3.7	U	ug/kg	3.7
4,4-DDE	2	J	ug/kg	4	3.7	U	ug/kg	3.7	4.2	UJ	ug/kg	4.2	3.7	U	ug/kg	3.7
Endrin	3.8	UJ	ug/kg	3.8	3.7	U	ug/kg	3.7	4.2	UJ	ug/kg	4.2	3.7	U	ug/kg	3.7
Endosulfan II	3.8	UJ	ug/kg	3.8	3.7	U	ug/kg	3.7	4.2	UJ	ug/kg	4.2	3.7	U	ug/kg	3.7
4,4-DDD	3.8	UJ	ug/kg	3.8	3.7	U	ug/kg	3.7	4.2	UJ	ug/kg	4.2	3.7	U	ug/kg	3.7
Endosulfan sulfate	3.8	UJ	ug/kg	3.8	3.7	UJ	ug/kg	3.7	4.2	UJ	ug/kg	4.2	3.7	UJ	ug/kg	3.7
4,4-DDT	2.7	J	ug/kg	4	3.7	U	ug/kg	3.7	4.2	UJ	ug/kg	4.2	3.7	U	ug/kg	3.7
Methoxychlor	20	UJ	ug/kg	20	19	U	ug/kg	19	22	UJ	ug/kg	22	19	U	ug/kg	19
Endrin ketone	3.8	UJ	ug/kg	3.8	3.7	U	ug/kg	3.7	4.2	UJ	ug/kg	4.2	3.7	U	ug/kg	3.7
Endrin aldehyde	3.8	UJ	ug/kg	3.8	3.7	U	ug/kg	3.7	4.2	UJ	ug/kg	4.2	3.7	U	ug/kg	3.7
alpha-Chlordane	2	UJ	ug/kg	2	1.9	U	ug/kg	1.9	2.2	UJ	ug/kg	2.2	1.9	U	ug/kg	1.9
gamma-Chlordane	2	UJ	ug/kg	2	1.9	U	ug/kg	1.9	2.2	UJ	ug/kg	2.2	1.9	U	ug/kg	1.9
Toxaphene	200	UJ	ug/kg	200	190	U	ug/kg	190	220	UJ	ug/kg	220	190	U	ug/kg	190
Aroclor-1016	38	UJ	ug/kg	38	37	U	ug/kg	37	42	UJ	ug/kg	42	37	U	ug/kg	37
Aroclor-1221	78	UJ	ug/kg	78	74	U	ug/kg	74	86	UJ	ug/kg	86	74	U	ug/kg	74
Aroclor-1232	38	UJ	ug/kg	38	37	U	ug/kg	37	42	UJ	ug/kg	42	37	U	ug/kg	37
Aroclor-1242	38	UJ	ug/kg	38	37	U	ug/kg	37	42	UJ	ug/kg	42	37	U	ug/kg	37
Aroclor-1248	38	UJ	ug/kg	38	37	U	ug/kg	37	42	UJ	ug/kg	42	37	U	ug/kg	37
Aroclor-1254	38	UJ	ug/kg	38	37	U	ug/kg	37	36	J	ug/kg	42	37	U	ug/kg	37
Aroclor-1260	38	UJ	ug/kg	38	37	U	ug/kg	37	42	UJ	ug/kg	42	37	U	ug/kg	37
CLP METALS AND CYANIDE mg/kg																
Aluminum	-		mg/kg		6570	J	mg/kg	40	10600	J	mg/kg	40	11100	J	mg/kg	40
Antimony	-		mg/kg		12	UJ	mg/kg	12	12	UJ	mg/kg	12	12	UJ	mg/kg	12
Arsenic	-		mg/kg		1.6	J	mg/kg	2	2.5	J	mg/kg	2	1.5	J	mg/kg	2
Barium	-		mg/kg		11.2	J	mg/kg	40	42.8	J	mg/kg	40	13.1	J	mg/kg	40
Beryllium	-		mg/kg		1	U	mg/kg	1	.11	J	mg/kg	1	.09	J	mg/kg	1
Cadmium	-		mg/kg		.36	J	mg/kg	1	.43	J	mg/kg	1	.25	J	mg/kg	1
Calcium	-		mg/kg		260	J	mg/kg	1000	907	J	mg/kg	1000	80.8	J	mg/kg	1000
Chromium	-		mg/kg		4.5		mg/kg	2	11.2		mg/kg	2	10.3		mg/kg	2
Cobalt	-		mg/kg		10	U	mg/kg	10	1.4	J	mg/kg	10	10	U	mg/kg	10
Copper	-		mg/kg		3.8	J	mg/kg	5	13.2		mg/kg	5	4.4	J	mg/kg	5
Iron	-		mg/kg		4090	J	mg/kg	20	5450	J	mg/kg	20	5160	J	mg/kg	20
Lead	-		mg/kg		6.5	J	mg/kg	.6	74.3	J	mg/kg	.6	4.4	J	mg/kg	.6
Magnesium	-		mg/kg		91.3	J	mg/kg	1000	264	J	mg/kg	1000	127	J	mg/kg	1000

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA856018				RA856006				RA856007				RA856003			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16S00101D				16S00201				16S00301				16S00401			
Collect Date:	09-JAN-96				09-JAN-96				09-JAN-96				08-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	-		mg/kg		97.2		mg/kg	3	123		mg/kg	3	95.8		mg/kg	3
Mercury	-		mg/kg		.1	U	mg/kg	.1	.1	U	mg/kg	.1	.1	U	mg/kg	.1
Nickel	-		mg/kg		8	U	mg/kg	8	2.7	J	mg/kg	8	2.3	J	mg/kg	8
Potassium	-		mg/kg		1000	UJ	mg/kg	1000	1000	UJ	mg/kg	1000	1000	UJ	mg/kg	1000
Selenium	-		mg/kg		1	U	mg/kg	1	1	U	mg/kg	1	.15	J	mg/kg	1
Silver	-		mg/kg		2	U	mg/kg	2	2	U	mg/kg	2	2	U	mg/kg	2
Sodium	-		mg/kg		120	J	mg/kg	1000	157	J	mg/kg	1000	1000	UJ	mg/kg	1000
Thallium	-		mg/kg		2	U	mg/kg	2	.18	J	mg/kg	2	.13	J	mg/kg	2
Vanadium	-		mg/kg		10.2	J	mg/kg	10	19.4		mg/kg	10	17.5		mg/kg	10
Zinc	-		mg/kg		8		mg/kg	4	59.2		mg/kg	4	6.3		mg/kg	4
Cyanide	-		mg/kg		.5	U	mg/kg	.5	.13	J	mg/kg	.5	.5	U	mg/kg	.5
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	

Naval Air Station Whit. Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:		RA856002				RA856009				RA856009DL				RA870004			
Site		WHITING				WHITING				WHITING				WHITING			
Locator		16S00501				16S00601				16S00601DL				16S00701			
Collect Date:		08-JAN-96				09-JAN-96				09-JAN-96				10-JAN-96			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/kg																
Chloromethane		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Bromomethane		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Vinyl chloride		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Chloroethane		11	UJ	ug/kg	11	12	UJ	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Methylene chloride		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	UJ	ug/kg	12
Acetone		11	UJ	ug/kg	11	12	UJ	ug/kg	12	-		ug/kg		12	UJ	ug/kg	12
Carbon disulfide		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	UJ	ug/kg	12
1,1-Dichloroethene		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	UJ	ug/kg	12
1,1-Dichloroethane		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
1,2-Dichloroethene (total)		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Chloroform		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
1,2-Dichloroethane		11	UJ	ug/kg	11	12	UJ	ug/kg	12	-		ug/kg		12	U	ug/kg	12
2-Butanone		11	UJ	ug/kg	11	12	UJ	ug/kg	12	-		ug/kg		12	UJ	ug/kg	12
1,1,1-Trichloroethane		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Carbon tetrachloride		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Bromodichloromethane		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
1,2-Dichloropropane		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
cis-1,3-Dichloropropene		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Trichloroethene		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Dibromochloromethane		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
1,1,2-Trichloroethane		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Benzene		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
trans-1,3-Dichloropropene		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Bromoform		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
4-Methyl-2-pentanone		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	UJ	ug/kg	12
2-Hexanone		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	UJ	ug/kg	12
Tetrachloroethene		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Toluene		1	J	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
1,1,2,2-Tetrachloroethane		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Chlorobenzene		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Ethylbenzene		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Styrene		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
Xylenes (total)		11	U	ug/kg	11	12	U	ug/kg	12	-		ug/kg		12	U	ug/kg	12
CLP SEMIVOLATILES 90-SOW	ug/kg																
Phenol		360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
bis(2-Chloroethyl) ether		360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
2-Chlorophenol		360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
1,3-Dichlorobenzene		360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
1,4-Dichlorobenzene		360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:		RA856002				RA856009				RA856009DL				RA870004		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16S00501				16S00601				16S00601DL				16S00701		
Collect Date:		08-JAN-96				09-JAN-96				09-JAN-96				10-JAN-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
2-Methylphenol	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
2,2-oxybis(1-Chloropropane)	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
4-Methylphenol	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
N-Nitroso-di-n-propylamine	360	U	ug/kg	360	420	UJ	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Hexachloroethane	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Nitrobenzene	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Isophorone	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
2-Nitrophenol	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
2,4-Dimethylphenol	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
bis(2-Chloroethoxy) methane	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
2,4-Dichlorophenol	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
1,2,4-Trichlorobenzene	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Naphthalene	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
4-Chloroaniline	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Hexachlorobutadiene	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
4-Chloro-3-methylphenol	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
2-Methylnaphthalene	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Hexachlorocyclopentadiene	360	U	ug/kg	360	420	UJ	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
2,4,6-Trichlorophenol	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
2,4,5-Trichlorophenol	900	U	ug/kg	900	1100	U	ug/kg	1100	2100	R	ug/kg	2100	1000	U	ug/kg	1000
2-Chloronaphthalene	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
2-Nitroaniline	900	U	ug/kg	900	1100	U	ug/kg	1100	2100	R	ug/kg	2100	1000	U	ug/kg	1000
Dimethylphthalate	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Acenaphthylene	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
2,6-Dinitrotoluene	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
3-Nitroaniline	900	U	ug/kg	900	1100	U	ug/kg	1100	2100	R	ug/kg	2100	1000	U	ug/kg	1000
Acenaphthene	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
2,4-Dinitrophenol	900	U	ug/kg	900	1100	U	ug/kg	1100	2100	R	ug/kg	2100	1000	U	ug/kg	1000
4-Nitrophenol	900	U	ug/kg	900	1100	U	ug/kg	1100	2100	R	ug/kg	2100	1000	U	ug/kg	1000
Dibenzofuran	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
2,4-Dinitrotoluene	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Diethylphthalate	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
4-Chlorophenyl-phenylether	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Fluorene	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
4-Nitroaniline	900	U	ug/kg	900	1100	U	ug/kg	1100	2100	R	ug/kg	2100	1000	U	ug/kg	1000
4,6-Dinitro-2-methylphenol	900	U	ug/kg	900	1100	U	ug/kg	1100	2100	R	ug/kg	2100	1000	U	ug/kg	1000
N-Nitrosodiphenylamine	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
4-Bromophenyl-phenylether	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Hexachlorobenzene	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Pentachlorophenol	900	U	ug/kg	900	1100	U	ug/kg	1100	2100	R	ug/kg	2100	1000	U	ug/kg	1000
Phenanthrene	360	U	ug/kg	360	440		ug/kg	420	320	R	ug/kg	840	52	J	ug/kg	400
Anthracene	360	U	ug/kg	360	95	J	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Carbazole	360	U	ug/kg	360	97	J	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Di-n-butylphthalate	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Fluoranthene	360	U	ug/kg	360	2300		ug/kg	420	2900	R	ug/kg	840	260	J	ug/kg	400
Pyrene	360	U	ug/kg	360	1700		ug/kg	420	2500	R	ug/kg	840	170	J	ug/kg	400
Butylbenzylphthalate	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
3,3-Dichlorobenzidine	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Benzo (a) anthracene	360	U	ug/kg	360	2300		ug/kg	420	2700	R	ug/kg	840	250	J	ug/kg	400
Chrysene	360	U	ug/kg	360	3200		ug/kg	420	3200	R	ug/kg	840	270	J	ug/kg	400
bis(2-Ethylhexyl) phthalate	360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	110	J	ug/kg	400

Lab Sample Number:		RA856002				RA856009				RA856009DL				RA870004			
Site		WHITING				WHITING				WHITING				WHITING			
Locator		16S00501				16S00601				16S00601DL				16S00701			
Collect Date:		08-JAN-96				09-JAN-96				09-JAN-96				10-JAN-96			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate		360	U	ug/kg	360	420	U	ug/kg	420	840	R	ug/kg	840	400	U	ug/kg	400
Benzo (b) fluoranthene		360	U	ug/kg	360	4000	R	ug/kg	420	3600		ug/kg	840	350	J	ug/kg	400
Benzo (k) fluoranthene		360	U	ug/kg	360	3200		ug/kg	420	2600	R	ug/kg	840	340	J	ug/kg	400
Benzo (a) pyrene		360	U	ug/kg	360	3400	R	ug/kg	420	3100		ug/kg	840	310	J	ug/kg	400
Indeno (1,2,3-cd) pyrene		360	U	ug/kg	360	1900		ug/kg	420	2200	R	ug/kg	840	240	J	ug/kg	400
Dibenzo (a,h) anthracene		360	U	ug/kg	360	700		ug/kg	420	540	R	ug/kg	840	110	J	ug/kg	400
Benzo (g,h,i) perylene		360	UJ	ug/kg	360	1200		ug/kg	420	1700	R	ug/kg	840	120	J	ug/kg	400
CLP PESTICIDES/PCBS 90-SOW	ug/kg																
alpha-BHC		1.8	U	ug/kg	1.8	11	U	ug/kg	11	-		ug/kg		10	U	ug/kg	10
beta-BHC		1.8	U	ug/kg	1.8	11	U	ug/kg	11	-		ug/kg		10	U	ug/kg	10
delta-BHC		1.8	U	ug/kg	1.8	11	U	ug/kg	11	-		ug/kg		10	U	ug/kg	10
gamma-BHC (Lindane)		1.8	U	ug/kg	1.8	11	U	ug/kg	11	-		ug/kg		10	U	ug/kg	10
Heptachlor		1.8	U	ug/kg	1.8	11	U	ug/kg	11	-		ug/kg		10	U	ug/kg	10
Aldrin		1.8	U	ug/kg	1.8	11	U	ug/kg	11	-		ug/kg		10	U	ug/kg	10
Heptachlor epoxide		1.8	U	ug/kg	1.8	11	U	ug/kg	11	-		ug/kg		10	U	ug/kg	10
Endosulfan I		1.8	U	ug/kg	1.8	11	U	ug/kg	11	-		ug/kg		10	U	ug/kg	10
Dieldrin		3.6	U	ug/kg	3.6	130		ug/kg	21	-		ug/kg		20	U	ug/kg	20
4,4-DDE		3.6	U	ug/kg	3.6	100		ug/kg	21	-		ug/kg		53		ug/kg	20
Endrin		3.6	U	ug/kg	3.6	21	U	ug/kg	21	-		ug/kg		20	U	ug/kg	20
Endosulfan II		3.6	U	ug/kg	3.6	21	U	ug/kg	21	-		ug/kg		20	U	ug/kg	20
4,4-DDD		3.6	U	ug/kg	3.6	21	U	ug/kg	21	-		ug/kg		18	J	ug/kg	20
Endosulfan sulfate		3.6	UJ	ug/kg	3.6	21	UJ	ug/kg	21	-		ug/kg		20	UJ	ug/kg	20
4,4-DDT		3.6	U	ug/kg	3.6	89		ug/kg	21	-		ug/kg		22		ug/kg	20
Methoxychlor		18	U	ug/kg	18	110	U	ug/kg	110	-		ug/kg		100	U	ug/kg	100
Endrin ketone		3.6	U	ug/kg	3.6	21	U	ug/kg	21	-		ug/kg		20	U	ug/kg	20
Endrin aldehyde		3.6	U	ug/kg	3.6	21	U	ug/kg	21	-		ug/kg		20	U	ug/kg	20
alpha-Chlordane		1.8	U	ug/kg	1.8	11	U	ug/kg	11	-		ug/kg		10	U	ug/kg	10
gamma-Chlordane		1.8	U	ug/kg	1.8	11	U	ug/kg	11	-		ug/kg		10	U	ug/kg	10
Toxaphene		180	U	ug/kg	180	1100	U	ug/kg	1100	-		ug/kg		1000	U	ug/kg	1000
Aroclor-1016		36	U	ug/kg	36	210	U	ug/kg	210	-		ug/kg		200	U	ug/kg	200
Aroclor-1221		73	U	ug/kg	73	420	U	ug/kg	420	-		ug/kg		410	U	ug/kg	410
Aroclor-1232		36	U	ug/kg	36	210	U	ug/kg	210	-		ug/kg		200	U	ug/kg	200
Aroclor-1242		36	U	ug/kg	36	210	U	ug/kg	210	-		ug/kg		200	U	ug/kg	200
Aroclor-1248		36	U	ug/kg	36	210	U	ug/kg	210	-		ug/kg		200	U	ug/kg	200
Aroclor-1254		36	U	ug/kg	36	210	U	ug/kg	210	-		ug/kg		200	U	ug/kg	200
Aroclor-1260		36	U	ug/kg	36	210	U	ug/kg	210	-		ug/kg		200	U	ug/kg	200
CLP METALS AND CYANIDE	mg/kg																
Aluminum		5610	J	mg/kg	40	7890	J	mg/kg	40	-		mg/kg		8820	J	mg/kg	40
Antimony		12	UJ	mg/kg	12	12	UJ	mg/kg	12	-		mg/kg		5.9	J	mg/kg	12
Arsenic		1.3	J	mg/kg	2	2.2	J	mg/kg	2	-		mg/kg		5.6		mg/kg	2
Barium		6.1	J	mg/kg	40	53.6		mg/kg	40	-		mg/kg		257		mg/kg	40
Beryllium		.06	J	mg/kg	1	.08	J	mg/kg	1	-		mg/kg		1	U	mg/kg	1
Cadmium		1	U	mg/kg	1	2.2		mg/kg	1	-		mg/kg		7.6		mg/kg	1
Calcium		70.8	J	mg/kg	1000	796	J	mg/kg	1000	-		mg/kg		2350		mg/kg	1000
Chromium		4		mg/kg	2	11.5		mg/kg	2	-		mg/kg		29.2		mg/kg	2
Cobalt		.69	J	mg/kg	10	1.5	J	mg/kg	10	-		mg/kg		4.1	J	mg/kg	10
Copper		5	UJ	mg/kg	5	71.7		mg/kg	5	-		mg/kg		202		mg/kg	5
Iron		3220	J	mg/kg	20	10300	J	mg/kg	20	-		mg/kg		30300		mg/kg	20
Lead		5.2	J	mg/kg	.6	236	J	mg/kg	.6	-		mg/kg		759		mg/kg	.6
Magnesium		82.7	J	mg/kg	1000	154	J	mg/kg	1000	-		mg/kg		443	J	mg/kg	1000

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA856002				RA856009				RA856009DL				RA870004			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16S00501				16S00601				16S00601DL				16S00701			
Collect Date:	08-JAN-96				09-JAN-96				09-JAN-96				10-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	112		mg/kg	3	132		mg/kg	3	-		mg/kg		275		mg/kg	3
Mercury	.1	U	mg/kg	.1	.09		mg/kg	.1	-		mg/kg		.65	J	mg/kg	.1
Nickel	8	U	mg/kg	8	4	J	mg/kg	8	-		mg/kg		17.7		mg/kg	8
Potassium	1000	U	mg/kg	1000	1000	UJ	mg/kg	1000	-		mg/kg		180	J	mg/kg	1000
Selenium	.15	J	mg/kg	1	1	U	mg/kg	1	-		mg/kg		1	U	mg/kg	1
Silver	2	U	mg/kg	2	1.2	J	mg/kg	2	-		mg/kg		7.1		mg/kg	2
Sodium	1000	UJ	mg/kg	1000	137	J	mg/kg	1000	-		mg/kg		361	J	mg/kg	1000
Thallium	2	U	mg/kg	2	2	U	mg/kg	2	-		mg/kg		2	U	mg/kg	2
Vanadium	7.3	J	mg/kg	10	14.9		mg/kg	10	-		mg/kg		14.4		mg/kg	10
Zinc	4.8		mg/kg	4	155		mg/kg	4	-		mg/kg		773		mg/kg	4
Cyanide	.14	J	mg/kg	.5	.2	J	mg/kg	.5	-		mg/kg		.5	UJ	mg/kg	.5
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	

Lab Sample Number:		RA856008				RA856008RE				RA856004				RA856004R			
Site		WHITING				WHITING				WHITING				WHITING			
Locator		16S00801				16S00801RE				16S00901				16S00901R			
Collect Date:		09-JAN-96				09-JAN-96				08-JAN-96				08-JAN-96			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/kg																
Chloromethane		12	U	ug/kg	12	-		ug/kg		11	UJ	ug/kg	11	-		ug/kg	
Bromomethane		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Vinyl chloride		12	U	ug/kg	12	-		ug/kg		11	UJ	ug/kg	11	-		ug/kg	
Chloroethane		12	UJ	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Methylene chloride		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Acetone		12	UJ	ug/kg	12	-		ug/kg		11	UJ	ug/kg	11	-		ug/kg	
Carbon disulfide		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
1,1-Dichloroethene		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
1,1-Dichloroethane		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
1,2-Dichloroethene (total)		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Chloroform		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
1,2-Dichloroethane		12	UJ	ug/kg	12	-		ug/kg		11	UJ	ug/kg	11	-		ug/kg	
2-Butanone		12	UJ	ug/kg	12	-		ug/kg		11	UJ	ug/kg	11	-		ug/kg	
1,1,1-Trichloroethane		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Carbon tetrachloride		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Bromodichloromethane		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
1,2-Dichloropropane		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
cis-1,3-Dichloropropene		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Trichloroethene		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Dibromochloromethane		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
1,1,2-Trichloroethane		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Benzene		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
trans-1,3-Dichloropropene		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Bromoform		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
4-Methyl-2-pentanone		12	U	ug/kg	12	-		ug/kg		11	UJ	ug/kg	11	-		ug/kg	
2-Hexanone		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Tetrachloroethene		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Toluene		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
1,1,2,2-Tetrachloroethane		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Chlorobenzene		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Ethylbenzene		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Styrene		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
Xylenes (total)		12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	-		ug/kg	
CLP SEMIVOLATILES 90-SOW	ug/kg																
Phenol		400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
bis(2-Chloroethyl) ether		400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
2-Chlorophenol		400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
1,3-Dichlorobenzene		400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
1,4-Dichlorobenzene		400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA856008				RA856008RE				RA856004				RA856004R			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16S00801				16S00801RE				16S00901				16S00901R			
Collect Date:	09-JAN-96				09-JAN-96				08-JAN-96				08-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
2-Methylphenol	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
2,2-oxybis(1-Chloropropane)	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
4-Methylphenol	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
N-Nitroso-di-n-propylamine	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Hexachloroethane	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Nitrobenzene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Isophorone	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
2-Nitrophenol	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
2,4-Dimethylphenol	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
bis(2-Chloroethoxy) methane	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
2,4-Dichlorophenol	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
1,2,4-Trichlorobenzene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Naphthalene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
4-Chloroaniline	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Hexachlorobutadiene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
4-Chloro-3-methylphenol	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
2-Methylnaphthalene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Hexachlorocyclopentadiene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
2,4,6-Trichlorophenol	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
2,4,5-Trichlorophenol	1000	R	ug/kg	980	1000	UJ	ug/kg	1000	950	R	ug/kg	950	950	U	ug/kg	950
2-Chloronaphthalene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
2-Nitroaniline	1000	R	ug/kg	980	1000	UJ	ug/kg	1000	950	R	ug/kg	950	950	U	ug/kg	950
Dimethylphthalate	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Acenaphthylene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
2,6-Dinitrotoluene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
3-Nitroaniline	1000	R	ug/kg	980	1000	UJ	ug/kg	1000	950	R	ug/kg	950	950	U	ug/kg	950
Acenaphthene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
2,4-Dinitrophenol	1000	R	ug/kg	980	1000	UJ	ug/kg	1000	950	R	ug/kg	950	950	U	ug/kg	950
4-Nitrophenol	1000	R	ug/kg	980	1000	UJ	ug/kg	1000	950	R	ug/kg	950	950	U	ug/kg	950
Dibenzofuran	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
2,4-Dinitrotoluene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Diethylphthalate	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
4-Chlorophenyl-phenylether	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Fluorene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
4-Nitroaniline	1000	R	ug/kg	980	1000	UJ	ug/kg	1000	950	R	ug/kg	950	950	U	ug/kg	950
4,6-Dinitro-2-methylphenol	1000	R	ug/kg	980	1000	UJ	ug/kg	1000	950	R	ug/kg	950	950	U	ug/kg	950
N-Nitrosodiphenylamine	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
4-Bromophenyl-phenylether	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Hexachlorobenzene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Pentachlorophenol	1000	R	ug/kg	980	1000	UJ	ug/kg	1000	950	R	ug/kg	950	950	U	ug/kg	950
Phenanthrene	400	R	ug/kg	400	400	UJ	ug/kg	400	44	R	ug/kg	380	380	U	ug/kg	380
Anthracene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Carbazole	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Di-n-butylphthalate	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Fluoranthene	400	R	ug/kg	400	400	UJ	ug/kg	400	110	R	ug/kg	380	86		ug/kg	380
Pyrene	400	R	ug/kg	400	400	UJ	ug/kg	400	220	R	ug/kg	380	150		ug/kg	380
Butylbenzylphthalate	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
3,3-Dichlorobenzidine	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Benzo (a) anthracene	400	R	ug/kg	400	400	UJ	ug/kg	400	70	R	ug/kg	380	67	J	ug/kg	380
Chrysene	400	R	ug/kg	400	400	UJ	ug/kg	400	120	R	ug/kg	380	120	J	ug/kg	380
bis(2-Ethylhexyl) phthalate	400	R	ug/kg	400	50	J	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380

Lab Sample Number:	RA856008				RA856008RE				RA856004				RA856004R			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16S00801				16S00801RE				16S00901				16S00901R			
Collect Date:	09-JAN-96				09-JAN-96				08-JAN-96				08-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	U	ug/kg	380
Benzo (b) fluoranthene	400	R	ug/kg	400	400	UJ	ug/kg	400	290	R	ug/kg	380	300	J	ug/kg	380
Benzo (k) fluoranthene	400	R	ug/kg	400	400	UJ	ug/kg	400	210	R	ug/kg	380	380	U	ug/kg	380
Benzo (a) pyrene	400	R	ug/kg	400	400	UJ	ug/kg	400	140	R	ug/kg	380	130	J	ug/kg	380
Indeno (1,2,3-cd) pyrene	400	R	ug/kg	400	400	UJ	ug/kg	400	69	R	ug/kg	380	90	J	ug/kg	380
Dibenzo (a,h) anthracene	400	R	ug/kg	400	400	UJ	ug/kg	400	380	R	ug/kg	380	380	UJ	ug/kg	380
Benzo (g,h,i) perylene	400	R	ug/kg	400	400	UJ	ug/kg	400	48	R	ug/kg	380	380	UJ	ug/kg	380
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	2.1	U	ug/kg	2.1	-		ug/kg		3.7	U	ug/kg	3.7	-		ug/kg	
beta-BHC	2.1	U	ug/kg	2.1	-		ug/kg		3.7	U	ug/kg	3.7	-		ug/kg	
delta-BHC	2.1	U	ug/kg	2.1	-		ug/kg		3.7	U	ug/kg	3.7	-		ug/kg	
gamma-BHC (Lindane)	2.1	U	ug/kg	2.1	-		ug/kg		3.7	U	ug/kg	3.7	-		ug/kg	
Heptachlor	2.1	U	ug/kg	2.1	-		ug/kg		3.7	U	ug/kg	3.7	-		ug/kg	
Aldrin	2.1	U	ug/kg	2.1	-		ug/kg		3.7	U	ug/kg	3.7	-		ug/kg	
Heptachlor epoxide	2.1	U	ug/kg	2.1	-		ug/kg		3.7	U	ug/kg	3.7	-		ug/kg	
Endosulfan I	2.1	U	ug/kg	2.1	-		ug/kg		3.7	U	ug/kg	3.7	-		ug/kg	
Dieldrin	9.2		ug/kg	4	-		ug/kg		17		ug/kg	7	-		ug/kg	
4,4-DDE	4	U	ug/kg	4	-		ug/kg		11		ug/kg	7	-		ug/kg	
Endrin	4	U	ug/kg	4	-		ug/kg		7.2	U	ug/kg	7.2	-		ug/kg	
Endosulfan II	4	U	ug/kg	4	-		ug/kg		7.2	U	ug/kg	7.2	-		ug/kg	
4,4-DDD	4	U	ug/kg	4	-		ug/kg		7.2	U	ug/kg	7.2	-		ug/kg	
Endosulfan sulfate	4	UJ	ug/kg	4	-		ug/kg		7.2	UJ	ug/kg	7.2	-		ug/kg	
4,4-DDT	4	U	ug/kg	4	-		ug/kg		16		ug/kg	7	-		ug/kg	
Methoxychlor	21	U	ug/kg	21	-		ug/kg		37	U	ug/kg	37	-		ug/kg	
Endrin ketone	4	U	ug/kg	4	-		ug/kg		7.2	U	ug/kg	7.2	-		ug/kg	
Endrin aldehyde	4	U	ug/kg	4	-		ug/kg		7.2	U	ug/kg	7.2	-		ug/kg	
alpha-Chlordane	2.1	U	ug/kg	2.1	-		ug/kg		2.6	J	ug/kg	4	-		ug/kg	
gamma-Chlordane	2.1	U	ug/kg	2.1	-		ug/kg		2.2	J	ug/kg	4	-		ug/kg	
Toxaphene	210	U	ug/kg	210	-		ug/kg		370	U	ug/kg	370	-		ug/kg	
Aroclor-1016	40	U	ug/kg	40	-		ug/kg		72	U	ug/kg	72	-		ug/kg	
Aroclor-1221	82	U	ug/kg	82	-		ug/kg		150	U	ug/kg	150	-		ug/kg	
Aroclor-1232	40	U	ug/kg	40	-		ug/kg		72	U	ug/kg	72	-		ug/kg	
Aroclor-1242	40	U	ug/kg	40	-		ug/kg		72	U	ug/kg	72	-		ug/kg	
Aroclor-1248	40	U	ug/kg	40	-		ug/kg		72	U	ug/kg	72	-		ug/kg	
Aroclor-1254	130		ug/kg	40	-		ug/kg		72	U	ug/kg	72	-		ug/kg	
Aroclor-1260	40	U	ug/kg	40	-		ug/kg		72	U	ug/kg	72	-		ug/kg	
CLP METALS AND CYANIDE mg/kg																
Aluminum	9300	J	mg/kg	40	-		mg/kg		8050	J	mg/kg	40	-		mg/kg	
Antimony	12	UJ	mg/kg	12	-		mg/kg		12	UJ	mg/kg	12	-		mg/kg	
Arsenic	3.4		mg/kg	2	-		mg/kg		2.8		mg/kg	2	-		mg/kg	
Barium	13.3	J	mg/kg	40	-		mg/kg		55.7		mg/kg	40	-		mg/kg	
Beryllium	.11	J	mg/kg	1	-		mg/kg		.11	J	mg/kg	1	-		mg/kg	
Cadmium	.36	J	mg/kg	1	-		mg/kg		.67	J	mg/kg	1	-		mg/kg	
Calcium	302	J	mg/kg	1000	-		mg/kg		1080	J	mg/kg	1000	-		mg/kg	
Chromium	11		mg/kg	2	-		mg/kg		11.3		mg/kg	2	-		mg/kg	
Cobalt	10	U	mg/kg	10	-		mg/kg		10	U	mg/kg	10	-		mg/kg	
Copper	5.2	J	mg/kg	5	-		mg/kg		20		mg/kg	5	-		mg/kg	
Iron	6380	J	mg/kg	20	-		mg/kg		5370	J	mg/kg	20	-		mg/kg	
Lead	19.8	J	mg/kg	.6	-		mg/kg		173	J	mg/kg	.6	-		mg/kg	
Magnesium	54.6	J	mg/kg	1000	-		mg/kg		298	J	mg/kg	1000	-		mg/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA856008				RA856008RE				RA856004				RA856004R			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16S00801				16S00801RE				16S00901				16S00901R			
Collect Date:	09-JAN-96				09-JAN-96				08-JAN-96				08-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	21.5		mg/kg	3	-		mg/kg		120		mg/kg	3	-		mg/kg	
Mercury	.1	U	mg/kg	.1	-		mg/kg		.1	U	mg/kg	.1	-		mg/kg	
Nickel	8	U	mg/kg	8	-		mg/kg		5.1	J	mg/kg	8	-		mg/kg	
Potassium	1000	UJ	mg/kg	1000	-		mg/kg		1000	UJ	mg/kg	1000	-		mg/kg	
Selenium	1	U	mg/kg	1	-		mg/kg		1	U	mg/kg	1	-		mg/kg	
Silver	2	U	mg/kg	2	-		mg/kg		2	U	mg/kg	2	-		mg/kg	
Sodium	149	J	mg/kg	1000	-		mg/kg		124	J	mg/kg	1000	-		mg/kg	
Thallium	2	U	mg/kg	2	-		mg/kg		2	U	mg/kg	2	-		mg/kg	
Vanadium	28.2		mg/kg	10	-		mg/kg		21.8		mg/kg	10	-		mg/kg	
Zinc	13.1		mg/kg	4	-		mg/kg		161		mg/kg	4	-		mg/kg	
Cyanide	.5	U	mg/kg	.5	-		mg/kg		.18	J	mg/kg	.5	-		mg/kg	
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA856014				RA856015				RA870005				RA856010			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16S01001				16S01001D				16S01101				16S01201			
Collect Date:	09-JAN-96				09-JAN-96				10-JAN-96				09-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/kg																
Chloromethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Bromomethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Vinyl chloride	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Chloroethane	11	U	ug/kg	11	11	UJ	ug/kg	11	12	U	ug/kg	12	13	UJ	ug/kg	13
Methylene chloride	11	U	ug/kg	11	11	U	ug/kg	11	12	UJ	ug/kg	12	13	U	ug/kg	13
Acetone	14	U	ug/kg	14	11	UJ	ug/kg	11	12	UJ	ug/kg	12	13	UJ	ug/kg	13
Carbon disulfide	11	UJ	ug/kg	11	11	U	ug/kg	11	12	UJ	ug/kg	12	13	U	ug/kg	13
1,1-Dichloroethene	11	UJ	ug/kg	11	11	U	ug/kg	11	12	UJ	ug/kg	12	13	U	ug/kg	13
1,1-Dichloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
1,2-Dichloroethene (total)	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Chloroform	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
1,2-Dichloroethane	11	U	ug/kg	11	11	UJ	ug/kg	11	12	U	ug/kg	12	13	UJ	ug/kg	13
2-Butanone	11	U	ug/kg	11	11	UJ	ug/kg	11	12	UJ	ug/kg	12	13	UJ	ug/kg	13
1,1,1-Trichloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Carbon tetrachloride	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Bromodichloromethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
1,2-Dichloropropane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
cis-1,3-Dichloropropene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Trichloroethene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Dibromochloromethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
1,1,2-Trichloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Benzene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
trans-1,3-Dichloropropene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Bromoform	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
4-Methyl-2-pentanone	11	U	ug/kg	11	11	U	ug/kg	11	12	UJ	ug/kg	12	13	U	ug/kg	13
2-Hexanone	11	U	ug/kg	11	11	U	ug/kg	11	12	UJ	ug/kg	12	13	U	ug/kg	13
Tetrachloroethene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Toluene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
1,1,2,2-Tetrachloroethane	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Chlorobenzene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Ethylbenzene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Styrene	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
Xylenes (total)	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12	13	U	ug/kg	13
CLP SEMIVOLATILES 90-SOW ug/kg																
Phenol	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
bis(2-Chloroethyl) ether	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
2-Chlorophenol	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
1,3-Dichlorobenzene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
1,4-Dichlorobenzene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA856014				RA856015				RA870005				RA856010			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16S01001				16S01001D				16S01101				16S01201			
Collect Date:	09-JAN-96				09-JAN-96				10-JAN-96				09-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
2-Methylphenol	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
2,2-oxybis(1-Chloropropane)	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
4-Methylphenol	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
N-Nitroso-di-n-propylamine	350	UJ	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	UJ	ug/kg	420
Hexachloroethane	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Nitrobenzene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Isophorone	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
2-Nitrophenol	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
2,4-Dimethylphenol	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
bis(2-Chloroethoxy) methane	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
2,4-Dichlorophenol	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
1,2,4-Trichlorobenzene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Naphthalene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
4-Chloroaniline	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Hexachlorobutadiene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
4-Chloro-3-methylphenol	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
2-Methylnaphthalene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Hexachlorocyclopentadiene	350	UJ	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	UJ	ug/kg	420
2,4,6-Trichlorophenol	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
2,4,5-Trichlorophenol	870	U	ug/kg	870	880	U	ug/kg	880	970	U	ug/kg	970	1100	U	ug/kg	1100
2-Chloronaphthalene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
2-Nitroaniline	870	U	ug/kg	870	880	U	ug/kg	880	970	U	ug/kg	970	1100	U	ug/kg	1100
Dimethylphthalate	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Acenaphthylene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
2,6-Dinitrotoluene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
3-Nitroaniline	870	U	ug/kg	870	880	U	ug/kg	880	970	U	ug/kg	970	1100	U	ug/kg	1100
Acenaphthene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
2,4-Dinitrophenol	870	U	ug/kg	870	880	U	ug/kg	880	970	U	ug/kg	970	1100	U	ug/kg	1100
4-Nitrophenol	870	U	ug/kg	870	880	U	ug/kg	880	970	U	ug/kg	970	1100	U	ug/kg	1100
Dibenzofuran	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
2,4-Dinitrotoluene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Diethylphthalate	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
4-Chlorophenyl-phenylether	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Fluorene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
4-Nitroaniline	870	U	ug/kg	870	880	U	ug/kg	880	970	U	ug/kg	970	1100	U	ug/kg	1100
4,6-Dinitro-2-methylphenol	870	U	ug/kg	870	880	U	ug/kg	880	970	U	ug/kg	970	1100	U	ug/kg	1100
N-Nitrosodiphenylamine	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
4-Bromophenyl-phenylether	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Hexachlorobenzene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Pentachlorophenol	870	U	ug/kg	870	880	U	ug/kg	880	970	U	ug/kg	970	1100	U	ug/kg	1100
Phenanthrene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Anthracene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Carbazole	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Di-n-butylphthalate	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Fluoranthene	350	U	ug/kg	350	350	U	ug/kg	350	59	J	ug/kg	380	420	U	ug/kg	420
Pyrene	350	U	ug/kg	350	350	U	ug/kg	350	44	J	ug/kg	380	420	U	ug/kg	420
Butylbenzylphthalate	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
3,3-Dichlorobenzidine	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Benzo (a) anthracene	350	U	ug/kg	350	350	U	ug/kg	350	56	J	ug/kg	380	420	U	ug/kg	420
Chrysene	350	U	ug/kg	350	350	U	ug/kg	350	62	J	ug/kg	380	54	J	ug/kg	420
bis(2-Ethylhexyl) phthalate	350	U	ug/kg	350	58	J	ug/kg	350	78	J	ug/kg	380	420	U	ug/kg	420

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA856014				RA856015				RA870005				RA856010			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16S01001				16S01001D				16S01101				16S01201			
Collect Date:	09-JAN-96				09-JAN-96				10-JAN-96				09-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Benzo (b) fluoranthene	350	U	ug/kg	350	350	U	ug/kg	350	86	J	ug/kg	380	420	U	ug/kg	420
Benzo (k) fluoranthene	350	U	ug/kg	350	350	UJ	ug/kg	350	73	J	ug/kg	380	420	U	ug/kg	420
Benzo (a) pyrene	350	U	ug/kg	350	350	U	ug/kg	350	71	J	ug/kg	380	120	J	ug/kg	420
Indeno (1,2,3-cd) pyrene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	62	J	ug/kg	420
Dibenzo (a,h) anthracene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	420	U	ug/kg	420
Benzo (g,h,i) perylene	350	U	ug/kg	350	350	U	ug/kg	350	380	U	ug/kg	380	490		ug/kg	420
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	1.8	UJ	ug/kg	1.8	3.6	U	ug/kg	3.6	2	U	ug/kg	2	2.2	UJ	ug/kg	2.2
beta-BHC	1.8	UJ	ug/kg	1.8	3.6	U	ug/kg	3.6	2	U	ug/kg	2	2.2	UJ	ug/kg	2.2
delta-BHC	1.8	UJ	ug/kg	1.8	3.6	U	ug/kg	3.6	2	U	ug/kg	2	2.2	UJ	ug/kg	2.2
gamma-BHC (Lindane)	1.8	UJ	ug/kg	1.8	3.6	U	ug/kg	3.6	2	U	ug/kg	2	2.2	UJ	ug/kg	2.2
Heptachlor	1.8	UJ	ug/kg	1.8	3.6	U	ug/kg	3.6	2	U	ug/kg	2	2.2	UJ	ug/kg	2.2
Aldrin	1.8	UJ	ug/kg	1.8	3.6	U	ug/kg	3.6	2	U	ug/kg	2	2.2	UJ	ug/kg	2.2
Heptachlor epoxide	1.8	UJ	ug/kg	1.8	3.6	U	ug/kg	3.6	2	U	ug/kg	2	2.2	UJ	ug/kg	2.2
Endosulfan I	1.8	UJ	ug/kg	1.8	3.6	U	ug/kg	3.6	2	U	ug/kg	2	2.2	UJ	ug/kg	2.2
Dieldrin	33	J	ug/kg	3	60		ug/kg	7	3.8	U	ug/kg	3.8	2.9	J	ug/kg	4
4,4-DDE	13	J	ug/kg	3	22		ug/kg	7	51		ug/kg	4	26	J	ug/kg	4
Endrin	3.5	UJ	ug/kg	3.5	7	U	ug/kg	7	3.8	U	ug/kg	3.8	4.2	UJ	ug/kg	4.2
Endosulfan II	3.5	UJ	ug/kg	3.5	7	U	ug/kg	7	3.8	U	ug/kg	3.8	4.2	UJ	ug/kg	4.2
4,4-DDD	3.5	UJ	ug/kg	3.5	7	U	ug/kg	7	2.1	J	ug/kg	4	4.2	UJ	ug/kg	4.2
Endosulfan sulfate	3.5	UJ	ug/kg	3.5	7	UJ	ug/kg	7	3.8	UJ	ug/kg	3.8	4.2	UJ	ug/kg	4.2
4,4-DDT	6.4	J	ug/kg	3	9		ug/kg	7	28		ug/kg	4	7.1	J	ug/kg	4
Methoxychlor	18	UJ	ug/kg	18	36	U	ug/kg	36	20	U	ug/kg	20	22	UJ	ug/kg	22
Endrin ketone	3.5	UJ	ug/kg	3.5	7	U	ug/kg	7	3.8	U	ug/kg	3.8	4.2	UJ	ug/kg	4.2
Endrin aldehyde	3.5	UJ	ug/kg	3.5	7	U	ug/kg	7	3.8	U	ug/kg	3.8	4.2	UJ	ug/kg	4.2
alpha-Chlordane	6.8	J	ug/kg	2	12	J	ug/kg	4	2	U	ug/kg	2	2.2	UJ	ug/kg	2.2
gamma-Chlordane	4	J	ug/kg	2	7.9	J	ug/kg	4	2	U	ug/kg	2	2.2	UJ	ug/kg	2.2
Toxaphene	180	UJ	ug/kg	180	360	U	ug/kg	360	200	U	ug/kg	200	220	UJ	ug/kg	220
Aroclor-1016	35	UJ	ug/kg	35	70	U	ug/kg	70	38	U	ug/kg	38	42	UJ	ug/kg	42
Aroclor-1221	71	UJ	ug/kg	71	140	U	ug/kg	140	78	U	ug/kg	78	85	UJ	ug/kg	85
Aroclor-1232	35	UJ	ug/kg	35	70	U	ug/kg	70	38	U	ug/kg	38	42	UJ	ug/kg	42
Aroclor-1242	35	UJ	ug/kg	35	70	U	ug/kg	70	38	U	ug/kg	38	42	UJ	ug/kg	42
Aroclor-1248	35	UJ	ug/kg	35	70	U	ug/kg	70	38	U	ug/kg	38	42	UJ	ug/kg	42
Aroclor-1254	35	UJ	ug/kg	35	70	U	ug/kg	70	38	U	ug/kg	38	42	UJ	ug/kg	42
Aroclor-1260	48	J	ug/kg	35	110	J	ug/kg	70	38	U	ug/kg	38	42	UJ	ug/kg	42
CLP METALS AND CYANIDE mg/kg																
Aluminum	2000	J	mg/kg	40	1780	J	mg/kg	40	8210	J	mg/kg	40	13900	J	mg/kg	40
Antimony	12	UJ	mg/kg	12	12	UJ	mg/kg	12	12	UJ	mg/kg	12	12	UJ	mg/kg	12
Arsenic	.76	J	mg/kg	2	.64	J	mg/kg	2	12.1		mg/kg	2	6.6		mg/kg	2
Barium	4.9	J	mg/kg	40	4	J	mg/kg	40	92.5		mg/kg	40	39.5	J	mg/kg	40
Beryllium	1	U	mg/kg	1	1	U	mg/kg	1	.06	J	mg/kg	1	.23	J	mg/kg	1
Cadmium	1	U	mg/kg	1	.23	J	mg/kg	1	5.3		mg/kg	1	2.1		mg/kg	1
Calcium	101	J	mg/kg	1000	99.8	J	mg/kg	1000	1230		mg/kg	1000	658	J	mg/kg	1000
Chromium	3.9		mg/kg	2	3.3		mg/kg	2	24.5		mg/kg	2	19.3		mg/kg	2
Cobalt	10	U	mg/kg	10	10	U	mg/kg	10	3.9	J	mg/kg	10	1.2	J	mg/kg	10
Copper	10.2		mg/kg	5	8.6		mg/kg	5	139		mg/kg	5	80.1		mg/kg	5
Iron	1470	J	mg/kg	20	1310	J	mg/kg	20	48900		mg/kg	20	13500	J	mg/kg	20
Lead	13.5	J	mg/kg	.6	12.4	J	mg/kg	.6	436		mg/kg	.6	128	J	mg/kg	.6
Magnesium	38.5	J	mg/kg	1000	29.9	J	mg/kg	1000	255	J	mg/kg	1000	168	J	mg/kg	1000

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA856014				RA856015				RA870005				RA856010			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16S01001				16S01001D				16S01101				16S01201			
Collect Date:	09-JAN-96				09-JAN-96				10-JAN-96				09-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	5.6		mg/kg	3	4.9		mg/kg	3	270		mg/kg	3	88.1		mg/kg	3
Mercury	.2		mg/kg	.1	.17		mg/kg	.1	.18	J	mg/kg	.1	.11		mg/kg	.1
Nickel	8	U	mg/kg	8	8	U	mg/kg	8	26		mg/kg	8	5.9	J	mg/kg	8
Potassium	1000	U	mg/kg	1000	77.6	J	mg/kg	1000	107	J	mg/kg	1000	1000	UJ	mg/kg	1000
Selenium	.13	J	mg/kg	1	1	U	mg/kg	1	1	U	mg/kg	1	.19	J	mg/kg	1
Silver	4.1		mg/kg	2	3.6		mg/kg	2	2.2	J	mg/kg	2	1.3	J	mg/kg	2
Sodium	139	J	mg/kg	1000	118	J	mg/kg	1000	189	J	mg/kg	1000	145	J	mg/kg	1000
Thallium	2	U	mg/kg	2	2	U	mg/kg	2	2	U	mg/kg	2	2	U	mg/kg	2
Vanadium	3.4	J	mg/kg	10	3.2	J	mg/kg	10	16.7		mg/kg	10	26.5		mg/kg	10
Zinc	4.1	J	mg/kg	4	3.4	J	mg/kg	4	488		mg/kg	4	177		mg/kg	4
Cyanide	.1	J	mg/kg	.5	.17	J	mg/kg	.5	.5	UJ	mg/kg	.5	.16	J	mg/kg	.5
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	

Naval Air Station Whi[illegible] Field, Milton, Florida
Site 16 Sur[illegible]ce Soil Data

Lab Sample Number:		RA856011				RA870003				RA856005				RA870007			
Site		WHITING				WHITING				WHITING				WHITING			
Locator		16S01301				16S01401				16S01501				16S01601			
Collect Date:		09-JAN-96				10-JAN-96				08-JAN-96				10-JAN-96			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/kg																
Chloromethane		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Bromomethane		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Vinyl chloride		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Chloroethane		11	UJ	ug/kg	11	11	U	ug/kg	11	11	UJ	ug/kg	11	12	U	ug/kg	12
Methylene chloride		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	UJ	ug/kg	12
Acetone		11	UJ	ug/kg	11	11	U	ug/kg	11	11	UJ	ug/kg	11	12	UJ	ug/kg	12
Carbon disulfide		11	U	ug/kg	11	11	UJ	ug/kg	11	11	U	ug/kg	11	12	UJ	ug/kg	12
1,1-Dichloroethene		11	U	ug/kg	11	11	UJ	ug/kg	11	11	U	ug/kg	11	12	UJ	ug/kg	12
1,1-Dichloroethane		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,2-Dichloroethene (total)		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Chloroform		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,2-Dichloroethane		11	UJ	ug/kg	11	11	U	ug/kg	11	11	UJ	ug/kg	11	12	U	ug/kg	12
2-Butanone		11	UJ	ug/kg	11	11	U	ug/kg	11	11	UJ	ug/kg	11	12	UJ	ug/kg	12
1,1,1-Trichloroethane		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Carbon tetrachloride		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Bromodichloromethane		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,2-Dichloropropane		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
cis-1,3-Dichloropropene		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Trichloroethene		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Dibromochloromethane		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,1,2-Trichloroethane		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Benzene		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
trans-1,3-Dichloropropene		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Bromoform		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
4-Methyl-2-pentanone		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	UJ	ug/kg	12
2-Hexanone		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	UJ	ug/kg	12
Tetrachloroethene		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Toluene		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
1,1,2,2-Tetrachloroethane		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Chlorobenzene		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Ethylbenzene		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Styrene		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
Xylenes (total)		11	U	ug/kg	11	11	U	ug/kg	11	11	U	ug/kg	11	12	U	ug/kg	12
CLP SEMIVOLATILES 90-SOW	ug/kg																
Phenol		370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
bis(2-Chloroethyl) ether		370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
2-Chlorophenol		370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
1,3-Dichlorobenzene		370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
1,4-Dichlorobenzene		370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA856011				RA870003				RA856005				RA870007			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16S01301				16S01401				16S01501				16S01601			
Collect Date:	09-JAN-96				10-JAN-96				08-JAN-96				10-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
2-Methylphenol	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
2,2-oxybis(1-Chloropropane)	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
4-Methylphenol	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
N-Nitroso-di-n-propylamine	370	UJ	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Hexachloroethane	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Nitrobenzene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Isophorone	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
2-Nitrophenol	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
2,4-Dimethylphenol	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
bis(2-Chloroethoxy) methane	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
2,4-Dichlorophenol	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
1,2,4-Trichlorobenzene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Naphthalene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
4-Chloroaniline	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Hexachlorobutadiene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
4-Chloro-3-methylphenol	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
2-Methylnaphthalene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Hexachlorocyclopentadiene	370	UJ	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
2,4,6-Trichlorophenol	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
2,4,5-Trichlorophenol	920	U	ug/kg	920	920	U	ug/kg	920	900	U	ug/kg	900	1000	U	ug/kg	1000
2-Chloronaphthalene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
2-Nitroaniline	920	U	ug/kg	920	920	U	ug/kg	920	900	U	ug/kg	900	1000	U	ug/kg	1000
Dimethylphthalate	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Acenaphthylene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
2,6-Dinitrotoluene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
3-Nitroaniline	920	U	ug/kg	920	920	U	ug/kg	920	900	U	ug/kg	900	1000	U	ug/kg	1000
Acenaphthene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
2,4-Dinitrophenol	920	U	ug/kg	920	920	U	ug/kg	920	900	U	ug/kg	900	1000	U	ug/kg	1000
4-Nitrophenol	920	U	ug/kg	920	920	U	ug/kg	920	900	U	ug/kg	900	1000	UJ	ug/kg	1000
Dibenzofuran	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
2,4-Dinitrotoluene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Diethylphthalate	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
4-Chlorophenyl-phenylether	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Fluorene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
4-Nitroaniline	920	U	ug/kg	920	920	U	ug/kg	920	900	U	ug/kg	900	1000	U	ug/kg	1000
4,6-Dinitro-2-methylphenol	920	U	ug/kg	920	920	U	ug/kg	920	900	U	ug/kg	900	1000	U	ug/kg	1000
N-Nitrosodiphenylamine	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
4-Bromophenyl-phenylether	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Hexachlorobenzene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Pentachlorophenol	920	U	ug/kg	920	920	U	ug/kg	920	900	U	ug/kg	900	1000	U	ug/kg	1000
Phenanthrene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Anthracene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Carbazole	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Di-n-butylphthalate	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Fluoranthene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Pyrene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Butylbenzylphthalate	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
3,3-Dichlorobenzidine	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Benzo (a) anthracene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Chrysene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
bis(2-Ethylhexyl) phthalate	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	45	J	ug/kg	400

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA856011				RA870003				RA856005				RA870007			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16S01301				16S01401				16S01501				16S01601			
Collect Date:	09-JAN-96				10-JAN-96				08-JAN-96				10-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Benzo (b) fluoranthene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Benzo (k) fluoranthene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Benzo (a) pyrene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Indeno (1,2,3-cd) pyrene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Dibenzo (a,h) anthracene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
Benzo (g,h,i) perylene	370	U	ug/kg	370	370	U	ug/kg	370	360	U	ug/kg	360	400	U	ug/kg	400
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	1.9	UJ	ug/kg	1.9	1.9	U	ug/kg	1.9	1.8	U	ug/kg	1.8	2	U	ug/kg	2
beta-BHC	1.9	UJ	ug/kg	1.9	1.9	U	ug/kg	1.9	1.8	U	ug/kg	1.8	2	U	ug/kg	2
delta-BHC	1.9	UJ	ug/kg	1.9	1.9	U	ug/kg	1.9	1.8	U	ug/kg	1.8	2	U	ug/kg	2
gamma-BHC (Lindane)	1.9	UJ	ug/kg	1.9	1.9	U	ug/kg	1.9	1.8	U	ug/kg	1.8	2	U	ug/kg	2
Heptachlor	1.9	UJ	ug/kg	1.9	1.9	U	ug/kg	1.9	1.8	U	ug/kg	1.8	2	U	ug/kg	2
Aldrin	1.9	UJ	ug/kg	1.9	1.9	U	ug/kg	1.9	1.8	U	ug/kg	1.8	2	U	ug/kg	2
Heptachlor epoxide	1.9	UJ	ug/kg	1.9	1.9	U	ug/kg	1.9	1.8	U	ug/kg	1.8	2	U	ug/kg	2
Endosulfan I	1.9	UJ	ug/kg	1.9	1.9	U	ug/kg	1.9	1.8	U	ug/kg	1.8	2	U	ug/kg	2
Dieldrin	7.2	J	ug/kg	4	3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6	4	U	ug/kg	4
4,4-DDE	3.7	UJ	ug/kg	3.7	3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6	4	U	ug/kg	4
Endrin	3.7	UJ	ug/kg	3.7	3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6	4	U	ug/kg	4
Endosulfan II	3.7	UJ	ug/kg	3.7	3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6	4	U	ug/kg	4
4,4-DDD	3.7	UJ	ug/kg	3.7	3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6	4	U	ug/kg	4
Endosulfan sulfate	3.7	UJ	ug/kg	3.7	3.7	UJ	ug/kg	3.7	3.6	UJ	ug/kg	3.6	4	UJ	ug/kg	4
4,4-DDT	3.7	UJ	ug/kg	3.7	3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6	4	U	ug/kg	4
Methoxychlor	19	UJ	ug/kg	19	19	U	ug/kg	19	18	U	ug/kg	18	20	U	ug/kg	20
Endrin ketone	3.7	UJ	ug/kg	3.7	3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6	4	U	ug/kg	4
Endrin aldehyde	3.7	UJ	ug/kg	3.7	3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6	4	U	ug/kg	4
alpha-Chlordane	1.6	J	ug/kg	2	1.9	U	ug/kg	1.9	1.8	U	ug/kg	1.8	2	U	ug/kg	2
gamma-Chlordane	1	J	ug/kg	2	1.9	U	ug/kg	1.9	1.8	U	ug/kg	1.8	2	U	ug/kg	2
Toxaphene	190	UJ	ug/kg	190	190	U	ug/kg	190	180	U	ug/kg	180	200	U	ug/kg	200
Aroclor-1016	37	UJ	ug/kg	37	37	U	ug/kg	37	36	U	ug/kg	36	40	U	ug/kg	40
Aroclor-1221	74	UJ	ug/kg	74	74	U	ug/kg	74	73	U	ug/kg	73	81	U	ug/kg	81
Aroclor-1232	37	UJ	ug/kg	37	37	U	ug/kg	37	36	U	ug/kg	36	40	U	ug/kg	40
Aroclor-1242	37	UJ	ug/kg	37	37	U	ug/kg	37	36	U	ug/kg	36	40	U	ug/kg	40
Aroclor-1248	37	UJ	ug/kg	37	37	U	ug/kg	37	36	U	ug/kg	36	40	U	ug/kg	40
Aroclor-1254	37	UJ	ug/kg	37	37	U	ug/kg	37	36	U	ug/kg	36	40	U	ug/kg	40
Aroclor-1260	37	UJ	ug/kg	37	37	U	ug/kg	37	36	U	ug/kg	36	40	U	ug/kg	40
CLP METALS AND CYANIDE mg/kg																
Aluminum	9130	J	mg/kg	40	8050	J	mg/kg	40	5010	J	mg/kg	40	7280	J	mg/kg	40
Antimony	12	UJ	mg/kg	12	12	UJ	mg/kg	12	12	UJ	mg/kg	12	12	UJ	mg/kg	12
Arsenic	1.6	J	mg/kg	2	1.5	J	mg/kg	2	1.4	J	mg/kg	2	2.2	J	mg/kg	2
Barium	12.3	J	mg/kg	40	19.7	J	mg/kg	40	7.8	J	mg/kg	40	10.7	J	mg/kg	40
Beryllium	.1	J	mg/kg	1	.09	J	mg/kg	1	.06	J	mg/kg	1	1	U	mg/kg	1
Cadmium	.21	J	mg/kg	1	.21	J	mg/kg	1	.23	J	mg/kg	1	.38	J	mg/kg	1
Calcium	441	J	mg/kg	1000	670	J	mg/kg	1000	96.5	J	mg/kg	1000	327	J	mg/kg	1000
Chromium	8		mg/kg	2	5.4		mg/kg	2	3.2		mg/kg	2	5.5		mg/kg	2
Cobalt	.7	J	mg/kg	10	.85	J	mg/kg	10	10	U	mg/kg	10	10	U	mg/kg	10
Copper	5.6		mg/kg	5	6.1		mg/kg	5	2.9	J	mg/kg	5	5.4	J	mg/kg	5
Iron	4760	J	mg/kg	20	4030		mg/kg	20	2920	J	mg/kg	20	5290		mg/kg	20
Lead	60	J	mg/kg	.6	22.9		mg/kg	.6	4.4	J	mg/kg	.6	15.8		mg/kg	.6
Magnesium	142	J	mg/kg	1000	186	J	mg/kg	1000	84.2	J	mg/kg	1000	95.8	J	mg/kg	1000

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA856011				RA870003				RA856005				RA870007			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16S01301				16S01401				16S01501				16S01601			
Collect Date:	09-JAN-96				10-JAN-96				08-JAN-96				10-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	54.7		mg/kg	3	372		mg/kg	3	253		mg/kg	3	32.3		mg/kg	3
Mercury	.1	U	mg/kg	.1	.05	J	mg/kg	.1	.1	U	mg/kg	.1	.06	J	mg/kg	.1
Nickel	8	U	mg/kg	8	4.1	J	mg/kg	8	8	U	mg/kg	8	8	U	mg/kg	8
Potassium	1000	UJ	mg/kg	1000	69.7	J	mg/kg	1000	1000	U	mg/kg	1000	76.9	J	mg/kg	1000
Selenium	1	U	mg/kg	1	.15	J	mg/kg	1	.2	J	mg/kg	1	1	U	mg/kg	1
Silver	2	U	mg/kg	2	2	U	mg/kg	2	2	U	mg/kg	2	2	U	mg/kg	2
Sodium	117	J	mg/kg	1000	181	J	mg/kg	1000	114	J	mg/kg	1000	186	J	mg/kg	1000
Thallium	2	U	mg/kg	2	2	U	mg/kg	2	2	U	mg/kg	2	2	U	mg/kg	2
Vanadium	14		mg/kg	10	11.2		mg/kg	10	7	J	mg/kg	10	13.3		mg/kg	10
Zinc	16.3		mg/kg	4	8		mg/kg	4	4.7		mg/kg	4	16.7		mg/kg	4
Cyanide	.5	U	mg/kg	.5	.5	U	mg/kg	.5	.51	J	mg/kg	.5	.5	UJ	mg/kg	.5
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	

Lab Sample Number:		RA870006		
Site		WHITING		
Locator		16S01701		
Collect Date:		10-JAN-96		
	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/kg				
Chloromethane	11	U	ug/kg	11
Bromomethane	11	U	ug/kg	11
Vinyl chloride	11	U	ug/kg	11
Chloroethane	11	U	ug/kg	11
Methylene chloride	11	UJ	ug/kg	11
Acetone	11	UJ	ug/kg	11
Carbon disulfide	11	UJ	ug/kg	11
1,1-Dichloroethene	11	UJ	ug/kg	11
1,1-Dichloroethane	11	U	ug/kg	11
1,2-Dichloroethene (total)	11	U	ug/kg	11
Chloroform	11	U	ug/kg	11
1,2-Dichloroethane	11	U	ug/kg	11
2-Butanone	11	UJ	ug/kg	11
1,1,1-Trichloroethane	11	U	ug/kg	11
Carbon tetrachloride	11	U	ug/kg	11
Bromodichloromethane	11	U	ug/kg	11
1,2-Dichloropropane	11	U	ug/kg	11
cis-1,3-Dichloropropene	11	U	ug/kg	11
Trichloroethene	11	U	ug/kg	11
Dibromochloromethane	11	U	ug/kg	11
1,1,2-Trichloroethane	11	U	ug/kg	11
Benzene	11	U	ug/kg	11
trans-1,3-Dichloropropene	11	U	ug/kg	11
Bromoform	11	U	ug/kg	11
4-Methyl-2-pentanone	11	UJ	ug/kg	11
2-Hexanone	11	UJ	ug/kg	11
Tetrachloroethene	11	U	ug/kg	11
Toluene	11	U	ug/kg	11
1,1,2,2-Tetrachloroethane	11	U	ug/kg	11
Chlorobenzene	11	U	ug/kg	11
Ethylbenzene	11	U	ug/kg	11
Styrene	11	U	ug/kg	11
Xylenes (total)	11	U	ug/kg	11
CLP SEMIVOLATILES 90-SOW ug/kg				
Phenol	360	U	ug/kg	360
bis(2-Chloroethyl) ether	360	U	ug/kg	360
2-Chlorophenol	360	U	ug/kg	360
1,3-Dichlorobenzene	360	U	ug/kg	360
1,4-Dichlorobenzene	360	U	ug/kg	360

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA870006			
Site	WHITING			
Locator	16S01701			
Collect Date:	10-JAN-96			
	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene	360	U	ug/kg	360
2-Methylphenol	360	U	ug/kg	360
2,2-oxybis(1-Chloropropane)	360	U	ug/kg	360
4-Methylphenol	360	U	ug/kg	360
N-Nitroso-di-n-propylamine	360	U	ug/kg	360
Hexachloroethane	360	U	ug/kg	360
Nitrobenzene	360	U	ug/kg	360
Isophorone	360	U	ug/kg	360
2-Nitrophenol	360	U	ug/kg	360
2,4-Dimethylphenol	360	U	ug/kg	360
bis(2-Chloroethoxy) methane	360	U	ug/kg	360
2,4-Dichlorophenol	360	U	ug/kg	360
1,2,4-Trichlorobenzene	360	U	ug/kg	360
Naphthalene	360	U	ug/kg	360
4-Chloroaniline	360	U	ug/kg	360
Hexachlorobutadiene	360	U	ug/kg	360
4-Chloro-3-methylphenol	360	U	ug/kg	360
2-Methylnaphthalene	360	U	ug/kg	360
Hexachlorocyclopentadiene	360	U	ug/kg	360
2,4,6-Trichlorophenol	360	U	ug/kg	360
2,4,5-Trichlorophenol	910	U	ug/kg	910
2-Chloronaphthalene	360	U	ug/kg	360
2-Nitroaniline	910	U	ug/kg	910
Dimethylphthalate	360	U	ug/kg	360
Acenaphthylene	360	U	ug/kg	360
2,6-Dinitrotoluene	360	U	ug/kg	360
3-Nitroaniline	910	U	ug/kg	910
Acenaphthene	360	U	ug/kg	360
2,4-Dinitrophenol	910	U	ug/kg	910
4-Nitrophenol	910	U	ug/kg	910
Dibenzofuran	360	U	ug/kg	360
2,4-Dinitrotoluene	360	U	ug/kg	360
Diethylphthalate	360	U	ug/kg	360
4-Chlorophenyl-phenylether	360	U	ug/kg	360
Fluorene	360	U	ug/kg	360
4-Nitroaniline	910	U	ug/kg	910
4,6-Dinitro-2-methylphenol	910	U	ug/kg	910
N-Nitrosodiphenylamine	360	U	ug/kg	360
4-Bromophenyl-phenylether	360	U	ug/kg	360
Hexachlorobenzene	360	U	ug/kg	360
Pentachlorophenol	910	U	ug/kg	910
Phenanthrene	360	U	ug/kg	360
Anthracene	360	U	ug/kg	360
Carbazole	360	U	ug/kg	360
Di-n-butylphthalate	360	U	ug/kg	360
Fluoranthene	360	U	ug/kg	360
Pyrene	360	U	ug/kg	360
Butylbenzylphthalate	360	U	ug/kg	360
3,3-Dichlorobenzidine	360	U	ug/kg	360
Benzo (a) anthracene	360	U	ug/kg	360
Chrysene	360	U	ug/kg	360
bis(2-Ethylhexyl) phthalate	48	J	ug/kg	360

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA870006			
Site	WHITING			
Locator	16S01701			
Collect Date:	10-JAN-96			
	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	360	U	ug/kg	360
Benzo (b) fluoranthene	360	U	ug/kg	360
Benzo (k) fluoranthene	360	U	ug/kg	360
Benzo (a) pyrene	360	U	ug/kg	360
Indeno (1,2,3-cd) pyrene	360	U	ug/kg	360
Dibenzo (a,h) anthracene	360	U	ug/kg	360
Benzo (g,h,i) perylene	360	U	ug/kg	360
CLP PESTICIDES/PCBS 90-SOW ug/kg				
alpha-BHC	1.9	U	ug/kg	1.9
beta-BHC	1.9	U	ug/kg	1.9
delta-BHC	1.9	U	ug/kg	1.9
gamma-BHC (Lindane)	1.9	U	ug/kg	1.9
Heptachlor	1.9	U	ug/kg	1.9
Aldrin	1.9	U	ug/kg	1.9
Heptachlor epoxide	1.9	U	ug/kg	1.9
Endosulfan I	1.9	U	ug/kg	1.9
Dieldrin	3.6	U	ug/kg	3.6
4,4-DDE	3.6	U	ug/kg	3.6
Endrin	3.6	U	ug/kg	3.6
Endosulfan II	3.6	U	ug/kg	3.6
4,4-DDD	3.6	U	ug/kg	3.6
Endosulfan sulfate	3.6	UJ	ug/kg	3.6
4,4-DDT	3.6	U	ug/kg	3.6
Methoxychlor	19	U	ug/kg	19
Endrin ketone	3.6	U	ug/kg	3.6
Endrin aldehyde	3.6	U	ug/kg	3.6
alpha-Chlordane	1.9	U	ug/kg	1.9
gamma-Chlordane	1.9	U	ug/kg	1.9
Toxaphene	190	U	ug/kg	190
Aroclor-1016	36	U	ug/kg	36
Aroclor-1221	74	U	ug/kg	74
Aroclor-1232	36	U	ug/kg	36
Aroclor-1242	36	U	ug/kg	36
Aroclor-1248	36	U	ug/kg	36
Aroclor-1254	36	U	ug/kg	36
Aroclor-1260	36	U	ug/kg	36
CLP METALS AND CYANIDE mg/kg				
Aluminum	4320	J	mg/kg	40
Antimony	12	UJ	mg/kg	12
Arsenic	1.3	J	mg/kg	2
Barium	6.7	J	mg/kg	40
Beryllium	1	U	mg/kg	1
Cadmium	.26	J	mg/kg	1
Calcium	158	J	mg/kg	1000
Chromium	3.5		mg/kg	2
Cobalt	10	U	mg/kg	10
Copper	5.8		mg/kg	5
Iron	3070		mg/kg	20
Lead	29.6		mg/kg	.6
Magnesium	56.6	J	mg/kg	1000

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Soil Data

Lab Sample Number:	RA870006			
Site	WHITING			
Locator	16S01701			
Collect Date:	10-JAN-96			
	VALUE	QUAL	UNITS	DL
Manganese	34.3		mg/kg	3
Mercury	.06	J	mg/kg	.1
Nickel	2.5	J	mg/kg	8
Potassium	1000	U	mg/kg	1000
Selenium	1	U	mg/kg	1
Silver	2	U	mg/kg	2
Sodium	170	J	mg/kg	1000
Thallium	2	U	mg/kg	2
Vanadium	7.3	J	mg/kg	10
Zinc	14.7		mg/kg	4
Cyanide	.5	UJ	mg/kg	.5
Total organic carbon	-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg	

APPENDIX E

SURFACE WATER ANALYTICAL DATA

Lab Sample Number: RA903003
Site WHITING
Locator 16W00101
Collect Date: 05-JAN-96

	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/l				
Chloromethane	10	U	ug/l	10
Bromomethane	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10
Chloroethane	10	U	ug/l	10
Methylene chloride	10	U	ug/l	10
Acetone	10	U	ug/l	10
Carbon disulfide	10	U	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10
1,2-Dichloroethene (total)	10	U	ug/l	10
Chloroform	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10
2-Butanone	10	U	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10
Trichloroethene	10	U	ug/l	10
Dibromochloromethane	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10
Benzene	10	U	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10
Bromoform	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10
Tetrachloroethene	10	U	ug/l	10
Toluene	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10
Styrene	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10
CLP SEMIVOLATILES 90-SOW ug/l				
Phenol	10	U	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10
2-Chlorophenol	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10
4-Methylphenol	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10
Nitrobenzene	10	U	ug/l	10
Isophorone	10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10

Naval Air Station Whiting Field, Milton, Florida
Site 16 Surface Water Data

Lab Sample Number:	RA903003			
Site	WHITING			
Locator	16W00101			
Collect Date:	05-JAN-96			
	VALUE	QUAL	UNITS	DL
bis(2-Chloroethoxy) methane	10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10
Naphthalene	10	U	ug/l	10
4-Chloroaniline	10	U	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10
2,4,5-Trichlorophenol	25	U	ug/l	25
2-Chloronaphthalene	10	U	ug/l	10
2-Nitroaniline	25	U	ug/l	25
Dimethylphthalate	10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10
3-Nitroaniline	25	U	ug/l	25
Acenaphthene	10	U	ug/l	10
2,4-Dinitrophenol	25	U	ug/l	25
4-Nitrophenol	25	U	ug/l	25
Dibenzofuran	10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10
Fluorene	10	U	ug/l	10
4-Nitroaniline	25	U	ug/l	25
4,6-Dinitro-2-methylphenol	25	U	ug/l	25
N-Nitrosodiphenylamine	10	U	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10
Pentachlorophenol	25	U	ug/l	25
Phenanthrene	10	U	ug/l	10
Anthracene	10	U	ug/l	10
Carbazole	10	U	ug/l	10
Di-n-butylphthalate	10	U	ug/l	10
Fluoranthene	10	U	ug/l	10
Pyrene	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10
3,3-Dichlorobenzidine	10	U	ug/l	10
Benzo (a) anthracene	10	U	ug/l	10
Chrysene	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10
Dibenzo (a,h) anthracene	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10
CLP PESTICIDES/PCBS 90-SOW ug/l				
alpha-BHC	.05	UJ	ug/l	.05

Lab Sample Number:	RA903003			
Site	WHITING			
Locator	16W00101			
Collect Date:	05-JAN-96			
	VALUE	QUAL	UNITS	DL
beta-BHC	.05	UJ	ug/l	.05
delta-BHC	.05	UJ	ug/l	.05
gamma-BHC (Lindane)	.05	UJ	ug/l	.05
Heptachlor	.05	UJ	ug/l	.05
Aldrin	.05	UJ	ug/l	.05
Heptachlor epoxide	.05	UJ	ug/l	.05
Endosulfan I	.05	UJ	ug/l	.05
Dieldrin	.1	UJ	ug/l	.1
4,4-DDE	.1	UJ	ug/l	.1
Endrin	.1	UJ	ug/l	.1
Endosulfan II	.1	UJ	ug/l	.1
4,4-DDD	.1	UJ	ug/l	.1
Endosulfan sulfate	.1	UJ	ug/l	.1
4,4-DDT	.1	UJ	ug/l	.1
Methoxychlor	.5	UJ	ug/l	.5
Endrin ketone	.1	UJ	ug/l	.1
Endrin aldehyde	.1	UJ	ug/l	.1
alpha-Chlordane	.05	UJ	ug/l	.05
gamma-Chlordane	.05	UJ	ug/l	.05
Toxaphene	5	UJ	ug/l	5
Aroclor-1016	1	UJ	ug/l	1
Aroclor-1221	2	UJ	ug/l	2
Aroclor-1232	1	UJ	ug/l	1
Aroclor-1242	1	UJ	ug/l	1
Aroclor-1248	1	UJ	ug/l	1
Aroclor-1254	1	UJ	ug/l	1
Aroclor-1260	1	UJ	ug/l	1
CLP METALS AND CYANIDE ug/l				
Aluminum	758		ug/l	200
Antimony	60	U	ug/l	60
Arsenic	10	U	ug/l	10
Barium	28.6	J	ug/l	200
Beryllium	.21	J	ug/l	5
Cadmium	5	U	ug/l	5
Calcium	8890		ug/l	5000
Chromium	10	U	ug/l	10
Cobalt	50	U	ug/l	50
Copper	25	UJ	ug/l	25
Iron	730		ug/l	100
Lead	5.2		ug/l	3
Magnesium	1170	J	ug/l	5000
Manganese	4.4	J	ug/l	15
Mercury	.2	U	ug/l	.2
Nickel	40	U	ug/l	40
Potassium	2780	J	ug/l	5000
Selenium	5	U	ug/l	5
Silver	10	U	ug/l	10
Sodium	1120	J	ug/l	5000
Thallium	10	U	ug/l	10
Vanadium	50	U	ug/l	50
Zinc	29.2		ug/l	20

Lab Sample Number:		RA903003		
Site		WHITING		
Locator		16W00101		
Collect Date:		05-JAN-96		
	VALUE	QUAL	UNITS	DL
Cyanide	10	U	ug/l	10

Qualifiers: U = NOT DETECTED J = ESTIMATED VALUE UJ = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED R = RESULT IS REJECTED AND UNUSABLE

APPENDIX F

GROUNDWATER ANALYTICAL DATA

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- VOLATILES -- REPORT NO. 10499

Lab Sample Number:	90226004				90214002				90272002				90272001			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	WHF16-1				WHF16-2				WHF16-2B				WHF16-2C			
Collect Date:	16-NOV-93				24-NOV-93				06-DEC-93				06-DEC-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW																
Chloromethane	10	U	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acetone	10	UJ	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbon disulfide	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethene (total)	10	U	ug/l	10	4	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroform	10	U	ug/l	10	3	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10	3	J	ug/l	10	10	U	ug/l	10	20		ug/l	10
2-Butanone	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Trichloroethene	10	U	ug/l	10	6	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibromochloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzene	10	U	ug/l	10	59	J	ug/l	10	10	U	ug/l	10	560	J	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromoform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Tetrachloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Toluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Styrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- VOLATILES -- REPORT NO. 10499

Lab Sample Number:		90225001				90221002				90220001				90220002		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		WHF16-3B				WHF16-3C				WHF16-3D				WHF16-3DA		
Collect Date:		15-NOV-93				12-NOV-93				11-NOV-93				11-NOV-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW																
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Methylene chloride	10	U	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Acetone	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Carbon disulfide	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethene (total)	10	U	ug/l	10	2	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroform	10	U	ug/l	10	3	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Butanone	10	U	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Trichloroethene	10	U	ug/l	10	4	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibromochloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromoform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Tetrachloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Toluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Styrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

Lab Sample Number:	90226001				90226002				90226003				90225002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	WHF16-4B				WHF16-4BA				WHF16-4CD				WHF16-4D			
Collect Date:	16-NOV-93				16-NOV-93				16-NOV-93				15-NOV-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW																
Chloromethane	5	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	2	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acetone	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Carbon disulfide	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethene (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Butanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Trichloroethene	10	U	ug/l	10	10	U	ug/l	10	4	J	ug/l	10	10	U	ug/l	10
Dibromochloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromoform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Tetrachloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Toluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Styrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- VOLATILES -- REPORT NO. 10499

Lab Sample Number:		90236003				RC016004				ME340009				ME340010		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		WHF16-5				16G00101				16G00101				16G00101D		
Collect Date:		17-NOV-93				19-AUG-96				24-JUL-97				24-JUL-97		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW																
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acetone	10	UJ	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbon disulfide	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethene (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Butanone	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Trichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibromochloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromoform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Tetrachloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Toluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Styrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

Lab Sample Number:		RB980006				RB980016				MC424004				ME322004		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16G00201				16G00202				16G00202				16G00202		
Collect Date:		14-AUG-96				15-AUG-96				19-NOV-96				23-JUL-97		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW																
Chloromethane	10	UJ	ug/l	10	10	UJ	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Chloroethane	10	UJ	ug/l	10	10	UJ	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Methylene chloride	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Acetone	10	UJ	ug/l	10	10	UJ	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Carbon disulfide	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
1,1-Dichloroethene	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
1,1-Dichloroethane	10	UJ	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
1,2-Dichloroethene (total)	10	U	ug/l	10	41		ug/l	10	46	J	ug/l	50	50		ug/l	50
Chloroform	10	U	ug/l	10	1	J	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
1,2-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	24	J	ug/l	50
2-Butanone	10	UJ	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
1,1,1-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Carbon tetrachloride	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Bromodichloromethane	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
1,2-Dichloropropane	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
cis-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Trichloroethene	10	U	ug/l	10	6	J	ug/l	10	7	J	ug/l	50	7	J	ug/l	50
Dibromochloromethane	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
1,1,2-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Benzene	10	U	ug/l	10	640	R	ug/l	10	800		ug/l	50	820		ug/l	50
trans-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Bromoform	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Tetrachloroethene	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Toluene	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Chlorobenzene	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Ethylbenzene	10	U	ug/l	10	3	J	ug/l	10	50	U	ug/l	50	6	J	ug/l	50
Styrene	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50
Xylenes (total)	10	U	ug/l	10	10	U	ug/l	10	50	U	ug/l	50	50	U	ug/l	50

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- VOLATILES -- REPORT NO. 10499

Lab Sample Number:		RB980017				MC424005				ME322005				RC016005		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16G00203				16G00203				16G00203				16G00301		
Collect Date:		15-AUG-96				19-NOV-96				23-JUL-97				20-AUG-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW																
Chloromethane	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acetone	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Carbon disulfide	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethene (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Butanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Trichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibromochloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzene	5	J	ug/l	10	31		ug/l	10	1	J	ug/l	10	10	UJ	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromoform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Tetrachloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Toluene	1	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Styrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

Lab Sample Number:	ME340008				RC016006				ME322002				RC016008			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00301				16G00302				16G00302				16G00303			
Collect Date:	24-JUL-97				20-AUG-96				22-JUL-97				21-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW																
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Bromomethane	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acetone	10	U	ug/l	10	16	UJ	ug/l	16	10	U	ug/l	10	10	UJ	ug/l	10
Carbon disulfide	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethene (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	3	J	ug/l	10
Chloroform	10	U	ug/l	10	10	U	ug/l	10	1	J	ug/l	10	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	2	J	ug/l	10
2-Butanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Trichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	2	J	ug/l	10
Dibromochloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromoform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Tetrachloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Toluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Styrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- VOLATILES -- REPORT NO. 10499

Lab Sample Number:	ME322003				RC016007				ME340006				RC016002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00303				16G00304				16G00304				16G00401			
Collect Date:	22-JUL-97				20-AUG-96				24-JUL-97				19-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW																
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acetone	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Carbon disulfide	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethene (total)	12		ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroform	1	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethane	8	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Butanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Trichloroethene	2	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibromochloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzene	130		ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromoform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Tetrachloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Toluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Styrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

Lab Sample Number:	ME306003				ME306004				RC016003				ME306005			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00401				16G00401D				16G00402				16G00402			
Collect Date:	22-JUL-97				22-JUL-97				19-AUG-96				22-JUL-97			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW																
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acetone	18	U	ug/l	18	14	U	ug/l	14	13	UJ	ug/l	13	10	U	ug/l	10
Carbon disulfide	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethene (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	1	J	ug/l	10
Chloroform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	1	J	ug/l	10
2-Butanone	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Trichloroethene	10	U	ug/l	10	10	U	ug/l	10	2	J	ug/l	10	3	J	ug/l	10
Dibromochloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	28		ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromoform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Tetrachloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Toluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Styrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- VOLATILES -- REPORT NO. 10499

Lab Sample Number:	RB980020				MC448003				ME306006				RB980021			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00403				16G00403				16G00403				16G00403D			
Collect Date:	16-AUG-96				22-NOV-96				22-JUL-97				16-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW																
Chloromethane	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Methylene chloride	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Acetone	10	UJ	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	UJ	ug/l	10
Carbon disulfide	10	UJ	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	UJ	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
1,2-Dichloroethene (total)	1	J	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	2	J	ug/l	10
Chloroform	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10	50	U	ug/l	50	29	J	ug/l	40	10	U	ug/l	10
2-Butanone	10	UJ	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	UJ	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Trichloroethene	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Dibromochloromethane	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Benzene	600	R	ug/l	10	550		ug/l	50	760		ug/l	40	600	R	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Bromoform	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Tetrachloroethene	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Toluene	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Styrene	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10	50	U	ug/l	50	40	U	ug/l	40	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING [illegible]D -- SITE 16
GROUNDWATER -- VOLATILES -- REPORT NO. 10499

Lab Sample Number:		RC016009				RC016013				RB980019				ME340002		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16G00501				16G00501D				16G00601				16G00601		
Collect Date:		21-AUG-96				21-AUG-96				16-AUG-96				23-JUL-97		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW																
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acetone	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Carbon disulfide	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethene (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Butanone	10	R	ug/l	10	10	R	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Trichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibromochloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromoform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Tetrachloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Toluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Styrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- VOLATILES -- REPORT NO. 10499

Lab Sample Number:	RB980018				ME340004				RB887015				ME348004			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00602				16G00602				16G00701				16G00701			
Collect Date:	15-AUG-96				23-JUL-97				25-JUL-96				25-JUL-97			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW																
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Acetone	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Carbon disulfide	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethene (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Butanone	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Trichloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibromochloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromoform	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Tetrachloroethene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Toluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Ethylbenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Styrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Xylenes (total)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING [illegible]D -- SITE 16
GROUNDWATER -- VOLATILES -- REPORT NO. 10499

Lab Sample Number:	RB887016				MC448001				ME348002				RB887017			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00702				16G00702				16G00702				16G00703			
Collect Date:	25-JUL-96				21-NOV-96				25-JUL-97				25-JUL-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW																
Chloromethane	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Methylene chloride	10	UJ	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	UJ	ug/l	10
Acetone	10	UJ	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	UJ	ug/l	10
Carbon disulfide	10	UJ	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	UJ	ug/l	10
1,1-Dichloroethene	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
1,1-Dichloroethane	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
1,2-Dichloroethene (total)	39		ug/l	10	22	J	ug/l	80	25	J	ug/l	40	10		ug/l	10
Chloroform	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
1,2-Dichloroethane	10	U	ug/l	10	80	U	ug/l	80	32	J	ug/l	40	10	U	ug/l	10
2-Butanone	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
1,1,1-Trichloroethane	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Carbon tetrachloride	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Bromodichloromethane	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
1,2-Dichloropropane	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
cis-1,3-Dichloropropene	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Trichloroethene	5	J	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	2	J	ug/l	10
Dibromochloromethane	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
1,1,2-Trichloroethane	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Benzene	640	R	ug/l	10	880		ug/l	80	800	R	ug/l	40	590	R	ug/l	10
trans-1,3-Dichloropropene	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Bromoform	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
2-Hexanone	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Tetrachloroethene	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Toluene	1	J	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Chlorobenzene	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Ethylbenzene	5	J	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Styrene	10	U	ug/l	10	80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10
Xylenes (total)	1	J	ug/l		80	U	ug/l	80	40	U	ug/l	40	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- VOLATILES -- REPORT NO. 10499

Lab Sample Number:	MC448002				ME348003			
Site	WHITING				WHITING			
Locator	16G00703				16G00703			
Collect Date:	21-NOV-96				25-JUL-97			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW								
Chloromethane	80	U	ug/l	80	20	U	ug/l	20
Bromomethane	80	U	ug/l	80	20	U	ug/l	20
Vinyl chloride	80	U	ug/l	80	20	U	ug/l	20
Chloroethane	80	U	ug/l	80	20	U	ug/l	20
Methylene chloride	80	U	ug/l	80	20	U	ug/l	20
Acetone	80	U	ug/l	80	20	U	ug/l	20
Carbon disulfide	80	U	ug/l	80	20	U	ug/l	20
1,1-Dichloroethene	80	U	ug/l	80	20	U	ug/l	20
1,1-Dichloroethane	80	U	ug/l	80	20	U	ug/l	20
1,2-Dichloroethene (total)	10	J	ug/l	80	10	J	ug/l	20
Chloroform	80	U	ug/l	80	20	U	ug/l	20
1,2-Dichloroethane	80	U	ug/l	80	20		ug/l	20
2-Butanone	80	U	ug/l	80	20	U	ug/l	20
1,1,1-Trichloroethane	80	U	ug/l	80	20	U	ug/l	20
Carbon tetrachloride	80	U	ug/l	80	20	U	ug/l	20
Bromodichloromethane	80	U	ug/l	80	20	U	ug/l	20
1,2-Dichloropropane	80	U	ug/l	80	20	U	ug/l	20
cis-1,3-Dichloropropene	80	U	ug/l	80	20	U	ug/l	20
Trichloroethene	80	U	ug/l	80	20	U	ug/l	20
Dibromochloromethane	80	U	ug/l	80	20	U	ug/l	20
1,1,2-Trichloroethane	80	U	ug/l	80	20	U	ug/l	20
Benzene	860		ug/l	80	480	R	ug/l	20
trans-1,3-Dichloropropene	80	U	ug/l	80	20	U	ug/l	20
Bromoform	80	U	ug/l	80	20	U	ug/l	20
4-Methyl-2-pentanone	80	U	ug/l	80	20	U	ug/l	20
2-Hexanone	80	U	ug/l	80	20	U	ug/l	20
Tetrachloroethene	80	U	ug/l	80	20	U	ug/l	20
Toluene	80	U	ug/l	80	20	U	ug/l	20
1,1,2,2-Tetrachloroethane	80	U	ug/l	80	20	U	ug/l	20
Chlorobenzene	80	U	ug/l	80	20	U	ug/l	20
Ethylbenzene	80	U	ug/l	80	20	U	ug/l	20
Styrene	80	U	ug/l	80	20	U	ug/l	20
Xylenes (total)	80	U	ug/l	80	20	U	ug/l	20

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10500

Lab Sample Number:	90226004				90214002				90272002				90272001			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	WHF16-1				WHF16-2				WHF16-2B				WHF16-2C			
Collect Date:	16-NOV-93				24-NOV-93				06-DEC-93				06-DEC-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW																
Phenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Chlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Nitrobenzene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Isophorone	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethoxy) methane	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Naphthalene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloroaniline	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,5-Trichlorophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
2-Chloronaphthalene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitroaniline	25	U	ug/l	25	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dimethylphthalate	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3-Nitroaniline	25	U	ug/l	25	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Acenaphthene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrophenol	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25
4-Nitrophenol	25	UJ	ug/l	25	25	U	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25
Dibenzofuran	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluorene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Nitroaniline	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25
4,6-Dinitro-2-methylphenol	25	U	ug/l	25	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
N-Nitrosodiphenylamine	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Pentachlorophenol	25	U	ug/l	25	25	U	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25
Phenanthrene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Anthracene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbazole	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Di-n-butylphthalate	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10500

Lab Sample Number:	90226004				90214002				90272002				90272001			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	WHF16-1				WHF16-2				WHF16-2B				WHF16-2C			
Collect Date:	16-NOV-93				24-NOV-93				06-DEC-93				06-DEC-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Fluoranthene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Pyrene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3,3-Dichlorobenzidine	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) anthracene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chrysene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibenzo (a,h) anthracene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

Lab Sample Number:		90225001				90221002				90220001				90220002		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		WHF16-3B				WHF16-3C				WHF16-3D				WHF16-3DA		
Collect Date:		15-NOV-93				12-NOV-93				11-NOV-93				11-NOV-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW																
Phenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Chlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
4-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Nitrobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Isophorone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethoxy) methane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Naphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloroaniline	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,5-Trichlorophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
2-Chloronaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitroaniline	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dimethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3-Nitroaniline	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Acenaphthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrophenol	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25	25	U	ug/l	25
4-Nitrophenol	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dibenzofuran	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluorene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10500

Lab Sample Number:	90225001				90221002			
Site	WHITING				WHITING			
Locator	WHF16-3B				WHF16-3C			
Collect Date:	15-NOV-93				12-NOV-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	25	UJ	ug/l	25	25	UJ	ug/l	25
4,6-Dinitro-2-methylphenol	25	U	ug/l	25	25	UJ	ug/l	25
N-Nitrosodiphenylamine	10	U	ug/l	10	10	U	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10	10	U	ug/l	10
Pentachlorophenol	25	UJ	ug/l	25	25	U	ug/l	25
Phenanthrene	10	U	ug/l	10	10	U	ug/l	10
Anthracene	10	U	ug/l	10	10	U	ug/l	10
Carbazole	10	U	ug/l	10	10	U	ug/l	10
Di-n-butylphthalate	10	U	ug/l	10	10	U	ug/l	10
Fluoranthene	10	U	ug/l	10	10	U	ug/l	10
Pyrene	10	U	ug/l	10	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	U	ug/l	10
3,3-Dichlorobenzidine	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) anthracene	10	U	ug/l	10	10	U	ug/l	10
Chrysene	10	U	ug/l	10	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	10	U	ug/l	10
Di-n-octylphthalate	10	UJ	ug/l	10	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	10	U	ug/l	10
Dibenzo (a,h) anthracene	10	U	ug/l	10	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	10	U	ug/l	10

Lab Sample Number:	90220001				90220002			
Site	WHITING				WHITING			
Locator	WHF16-3D				WHF16-3DA			
Collect Date:	11-NOV-93				11-NOV-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	25	UJ	ug/l	25	25	UJ	ug/l	25
4,6-Dinitro-2-methylphenol	25	UJ	ug/l	25	25	UJ	ug/l	25
N-Nitrosodiphenylamine	10	U	ug/l	10	10	U	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10	10	U	ug/l	10
Pentachlorophenol	25	U	ug/l	25	25	U	ug/l	25
Phenanthrene	10	U	ug/l	10	10	U	ug/l	10
Anthracene	10	U	ug/l	10	10	U	ug/l	10
Carbazole	10	U	ug/l	10	10	U	ug/l	10
Di-n-butylphthalate	10	U	ug/l	10	10	U	ug/l	10
Fluoranthene	10	U	ug/l	10	10	U	ug/l	10
Pyrene	10	U	ug/l	10	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	U	ug/l	10
3,3-Dichlorobenzidine	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) anthracene	10	U	ug/l	10	10	U	ug/l	10
Chrysene	10	U	ug/l	10	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	10	U	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	10	U	ug/l	10
Dibenzo (a,h) anthracene	10	U	ug/l	10	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10500

Lab Sample Number:	90226001				90226002				90226003				90225002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	WHF16-4B				WHF16-4BA				WHF16-4CD				WHF16-4D			
Collect Date:	16-NOV-93				16-NOV-93				16-NOV-93				15-NOV-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW																
Phenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Chlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Nitrobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Isophorone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethoxy) methane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Naphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloroaniline	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,5-Trichlorophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	26	U	ug/l	26
2-Chloronaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitroaniline	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	26	U	ug/l	26
Dimethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3-Nitroaniline	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	26	U	ug/l	26
Acenaphthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrophenol	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25	26	UJ	ug/l	26
4-Nitrophenol	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25	26	UJ	ug/l	26
Dibenzofuran	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluorene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10500

Lab Sample Number:	90226001				90226002				90226003				90225002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	WHF16-4B				WHF16-4BA				WHF16-4CD				WHF16-4D			
Collect Date:	16-NOV-93				16-NOV-93				16-NOV-93				15-NOV-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25	26	UJ	ug/l	26
4,6-Dinitro-2-methylphenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	26	U	ug/l	26
N-Nitrosodiphenylamine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Pentachlorophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	26	UJ	ug/l	26
Phenanthrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbazole	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Di-n-butylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3,3-Dichlorobenzidine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chrysene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	10	U	ug/l	10	10		ug/l	10	10	U	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibenzo (a,h) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

Lab Sample Number:	90236003				RC016004				RB980006				RB980016			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	WHF16-5				16G00101				16G00201				16G00202			
Collect Date:	17-NOV-93				19-AUG-96				14-AUG-96				15-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW																
Phenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Chlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Nitrobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Isophorone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethoxy) methane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Naphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	1	J	ug/l	10
4-Chloroaniline	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,5-Trichlorophenol	50	U	ug/l	50	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
2-Chloronaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitroaniline	50	U	ug/l	50	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dimethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3-Nitroaniline	50	U	ug/l	50	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Acenaphthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrophenol	50	U	ug/l	50	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25
4-Nitrophenol	50	U	ug/l	50	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dibenzofuran	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluorene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10500

Lab Sample Number:	90236003				RC016004				RB980006				RB980016			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	WHF16-5				16G00101				16G00201				16G00202			
Collect Date:	17-NOV-93				19-AUG-96				14-AUG-96				15-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	50	U	ug/l	50	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25
4,6-Dinitro-2-methylphenol	50	U	ug/l	50	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25
N-Nitrosodiphenylamine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Pentachlorophenol	50	U	ug/l	50	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25
Phenanthrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbazole	-				10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Di-n-butylphthalate	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3,3-Dichlorobenzidine	20	U	ug/l	20	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Benzo (a) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chrysene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	2	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	1	J	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibenzo (a,h) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

Lab Sample Number:		RB980017				RC016005				RC016006				RC016008		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16G00203				16G00301				16G00302				16G00303		
Collect Date:		15-AUG-96				20-AUG-96				20-AUG-96				21-AUG-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW																
Phenol	5	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Chlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Nitrobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Isophorone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethoxy) methane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Naphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloroaniline	10	UJ	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,5-Trichlorophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
2-Chloronaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitroaniline	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dimethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3-Nitroaniline	25	UJ	ug/l	25	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Acenaphthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrophenol	25	UJ	ug/l	25	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
4-Nitrophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dibenzofuran	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluorene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10500

Lab Sample Number:	RB980017				RC016005				RC016006				RC016008			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00203				16G00301				16G00302				16G00303			
Collect Date:	15-AUG-96				20-AUG-96				20-AUG-96				21-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	25	UJ	ug/l	25	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
4,6-Dinitro-2-methylphenol	25	UJ	ug/l	25	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
N-Nitrosodiphenylamine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Pentachlorophenol	25	UJ	ug/l	25	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Phenanthrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbazole	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Di-n-butylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3,3-Dichlorobenzidine	10	UJ	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chrysene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibenzo (a,h) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

Lab Sample Number:	RC016007				RC016002				RC016003				RB980020			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00304				16G00401				16G00402				16G00403			
Collect Date:	20-AUG-96				19-AUG-96				19-AUG-96				16-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW																
Phenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	8	J	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Chlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Nitrobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Isophorone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethoxy) methane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Naphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	1	J	ug/l	10
4-Chloroaniline	10	U	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,5-Trichlorophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
2-Chloronaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitroaniline	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dimethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3-Nitroaniline	25	U	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25
Acenaphthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrophenol	25	U	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25
4-Nitrophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dibenzofuran	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluorene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10500

Lab Sample Number:	RC016007				RC016002				RC016003				RB980020			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00304				16G00401				16G00402				16G00403			
Collect Date:	20-AUG-96				19-AUG-96				19-AUG-96				16-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	25	U	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25
4,6-Dinitro-2-methylphenol	25	U	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25
N-Nitrosodiphenylamine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Pentachlorophenol	25	U	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25
Phenanthrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbazole	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Di-n-butylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3,3-Dichlorobenzidine	10	U	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Benzo (a) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chrysene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	53		ug/l	10	10	U	ug/l	10	1	J	ug/l	10	1	J	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibenzo (a,h) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING [illegible]D -- SITE 16
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10500

Lab Sample Number:	RB980021				RC016009				RC016013				RB980019			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00403D				16G00501				16G00501D				16G00601			
Collect Date:	16-AUG-96				21-AUG-96				21-AUG-96				16-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW																
Phenol	8	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Chlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Nitrobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Isophorone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethoxy) methane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Naphthalene	2	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloroaniline	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,5-Trichlorophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
2-Chloronaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitroaniline	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dimethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3-Nitroaniline	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Acenaphthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrophenol	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
4-Nitrophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dibenzofuran	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluorene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10500

Lab Sample Number:	RB980021				RC016009				RC016013				RB980019			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00403D				16G00501				16G00501D				16G00601			
Collect Date:	16-AUG-96				21-AUG-96				21-AUG-96				16-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
4,6-Dinitro-2-methylphenol	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
N-Nitrosodiphenylamine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Pentachlorophenol	25	UJ	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Phenanthrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbazole	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Di-n-butylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3,3-Dichlorobenzidine	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chrysene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	2	J	ug/l	10	10	U	ug/l	10	1	J	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibenzo (a,h) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10500

Lab Sample Number:		RB980018				RB887015				RB887016				RB887017		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16G00602				16G00701				16G00702				16G00703		
Collect Date:		15-AUG-96				25-JUL-96				25-JUL-96				25-JUL-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 90-SOW																
Phenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	4	J	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Chlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Nitrobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Isophorone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Chloroethoxy) methane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Naphthalene	10	U	ug/l	10	10	U	ug/l	10	1	J	ug/l	10	10	U	ug/l	10
4-Chloroaniline	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4,5-Trichlorophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
2-Chloronaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2-Nitroaniline	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dimethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3-Nitroaniline	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Acenaphthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
4-Nitrophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Dibenzofuran	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluorene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- SEMIVOLATILES -- REPORT NO. 10500

Lab Sample Number:	RB980018				RB887015				RB887016				RB887017			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00602				16G00701				16G00702				16G00703			
Collect Date:	15-AUG-96				25-JUL-96				25-JUL-96				25-JUL-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Nitroaniline	25	U	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25	25	UJ	ug/l	25
4,6-Dinitro-2-methylphenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
N-Nitrosodiphenylamine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Pentachlorophenol	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25	25	U	ug/l	25
Phenanthrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Carbazole	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Di-n-butylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3,3-Dichlorobenzidine	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chrysene	10	U	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
bis(2-Ethylhexyl) phthalate	6	J	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibenzo (a,h) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

Lab Sample Number:	90226004				90214002				90272002				90272001			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	WHF16-1				WHF16-2				WHF16-2B				WHF16-2C			
Collect Date:	16-NOV-93				24-NOV-93				06-DEC-93				06-DEC-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 90-SOW																
alpha-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
beta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
delta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Aldrin	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Endosulfan I	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Dieldrin	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4-DDE	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endrin	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan II	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4-DDD	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4-DDT	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Methoxychlor	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Endrin ketone	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endrin aldehyde	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
alpha-Chlordane	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
gamma-Chlordane	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Toxaphene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Aroclor-1016	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1221	2	U	ug/l	2	2	U	ug/l	2	2	U	ug/l	2	2	U	ug/l	2
Aroclor-1232	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1242	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1248	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1254	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1260	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- PESTICIDES/PCBs -- REPORT NO. 10501

Lab Sample Number:	90225001				90221002				90220001				90220002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	WHF16-3B				WHF16-3C				WHF16-3D				WHF16-3DA			
Collect Date:	15-NOV-93				12-NOV-93				11-NOV-93				11-NOV-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 90-SOW																
alpha-BHC	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
beta-BHC	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
delta-BHC	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Heptachlor	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Aldrin	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Endosulfan I	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Dieldrin	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDE	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endrin	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endosulfan II	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDD	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDT	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Methoxychlor	.5	U	ug/l	.5	.5	UJ	ug/l	.5	.5	UJ	ug/l	.5	.5	UJ	ug/l	.5
Endrin ketone	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Endrin aldehyde	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
alpha-Chlordane	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
gamma-Chlordane	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
Toxaphene	5	U	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5
Aroclor-1016	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1221	2	U	ug/l	2	2	UJ	ug/l	2	2	UJ	ug/l	2	2	UJ	ug/l	2
Aroclor-1232	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1242	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1248	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1254	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1
Aroclor-1260	1	U	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1	1	UJ	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- PESTICIDES/PCBs -- REPORT NO. 10501

Lab Sample Number:	90226001				90226002				90226003				90225002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	WHF16-4B				WHF16-4BA				WHF16-4CD				WHF16-4D			
Collect Date:	16-NOV-93				16-NOV-93				16-NOV-93				15-NOV-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 90-SOW																
alpha-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
beta-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
delta-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
gamma-BHC (Lindane)	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
Heptachlor	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
Aldrin	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
Heptachlor epoxide	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
Endosulfan I	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
Dieldrin	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
4,4-DDE	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
Endrin	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
Endosulfan II	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
4,4-DDD	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
Endosulfan sulfate	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
4,4-DDT	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
Methoxychlor	.5	UJ	ug/l	.5	.5	U	ug/l	.5	.5	UJ	ug/l	.5	.5	U	ug/l	.5
Endrin ketone	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
Endrin aldehyde	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
alpha-Chlordane	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
gamma-Chlordane	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
Toxaphene	5	UJ	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
Aroclor-1016	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1
Aroclor-1221	2	UJ	ug/l	2	2	U	ug/l	2	2	UJ	ug/l	2	2	U	ug/l	2
Aroclor-1232	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1
Aroclor-1242	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1
Aroclor-1248	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1
Aroclor-1254	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1
Aroclor-1260	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE
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NAS WHITING FIELD -- SITE 16
GROUNDWATER -- PESTICIDES/PCBs -- REPORT NO. 10501

Lab Sample Number:	90236003				RC016004				RB980006				RB980016			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	WHF16-5				16G00101				16G00201				16G00202			
Collect Date:	17-NOV-93				19-AUG-96				14-AUG-96				15-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 90-SOW																
alpha-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
beta-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
delta-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05
gamma-BHC (Lindane)	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
Heptachlor	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
Aldrin	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
Heptachlor epoxide	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
Endosulfan I	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
Dieldrin	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
4,4-DDE	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
Endrin	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
Endosulfan II	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
4,4-DDD	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
Endosulfan sulfate	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
4,4-DDT	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
Methoxychlor	.5	UJ	ug/l	.5	.5	U	ug/l	.5	.5	UJ	ug/l	.5	.5	U	ug/l	.5
Endrin ketone	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
Endrin aldehyde	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1
alpha-Chlordane	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
gamma-Chlordane	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05
Toxaphene	5	UJ	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
Aroclor-1016	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1
Aroclor-1221	2	UJ	ug/l	2	2	U	ug/l	2	2	UJ	ug/l	2	2	U	ug/l	2
Aroclor-1232	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1
Aroclor-1242	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1
Aroclor-1248	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1
Aroclor-1254	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1
Aroclor-1260	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- PESTICIDES/PCBs -- REPORT NO. 10501

Lab Sample Number:	RB980017				RC016005				RC016006				RC016008			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00203				16G00301				16G00302				16G00303			
Collect Date:	15-AUG-96				20-AUG-96				20-AUG-96				21-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 90-SOW																
alpha-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
beta-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
delta-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
gamma-BHC (Lindane)	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Aldrin	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor epoxide	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Endosulfan I	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Dieldrin	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4-DDE	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endrin	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan II	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4-DDD	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan sulfate	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4-DDT	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Methoxychlor	.5	UJ	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Endrin ketone	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endrin aldehyde	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
alpha-Chlordane	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
gamma-Chlordane	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Toxaphene	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Aroclor-1016	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1221	2	UJ	ug/l	2	2	U	ug/l	2	2	U	ug/l	2	2	U	ug/l	2
Aroclor-1232	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1242	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1248	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1254	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1260	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- PESTICIDES/PCBs -- REPORT NO. 10501

Lab Sample Number:	RC016007				RC016002				RC016003				RB980020			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00304				16G00401				16G00402				16G00403			
Collect Date:	20-AUG-96				19-AUG-96				19-AUG-96				16-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 90-SOW																
alpha-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
beta-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
delta-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
gamma-BHC (Lindane)	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Heptachlor	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Aldrin	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Heptachlor epoxide	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Endosulfan I	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Dieldrin	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDE	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
Endrin	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
Endosulfan II	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDD	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
Endosulfan sulfate	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDT	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
Methoxychlor	.5	UJ	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	UJ	ug/l	.5
Endrin ketone	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
Endrin aldehyde	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
alpha-Chlordane	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
gamma-Chlordane	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Toxaphene	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5
Aroclor-1016	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1221	2	UJ	ug/l	2	2	U	ug/l	2	2	U	ug/l	2	2	UJ	ug/l	2
Aroclor-1232	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1242	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1248	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1254	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1260	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING [illegible]D -- SITE 16
GROUNDWATER -- PESTICIDES/PCBs -- REPORT NO. 10501

Lab Sample Number:	RB980020				RC016009				RC016013				RB980019			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00403D				16G00501				16G00501D				16G00601			
Collect Date:	16-AUG-96				21-AUG-96				21-AUG-96				16-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 90-SOW																
alpha-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
beta-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
delta-BHC	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
gamma-BHC (Lindane)	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Heptachlor	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Aldrin	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Heptachlor epoxide	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Endosulfan I	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Dieldrin	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDE	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
Endrin	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
Endosulfan II	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDD	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
Endosulfan sulfate	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDT	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.15	J	ug/l	.1
Methoxychlor	.5	UJ	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	UJ	ug/l	.5
Endrin ketone	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
Endrin aldehyde	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
alpha-Chlordane	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
gamma-Chlordane	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Toxaphene	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5
Aroclor-1016	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1221	2	UJ	ug/l	2	2	U	ug/l	2	2	U	ug/l	2	2	UJ	ug/l	2
Aroclor-1232	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1242	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1248	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1254	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1260	1	UJ	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- PESTICIDES/PCBs -- REPORT NO. 10501

Lab Sample Number:		RB980018				RB887015				RB887016				RB887017		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16G00602				16G00701				16G00702				16G00703		
Collect Date:		15-AUG-96				25-JUL-96				25-JUL-96				25-JUL-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 90-SOW																
alpha-BHC	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
beta-BHC	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
delta-BHC	.05	UJ	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Heptachlor	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Aldrin	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Endosulfan I	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Dieldrin	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDE	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
Endrin	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
Endosulfan II	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDD	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
4,4-DDT	.14	J	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1	.1	UJ	ug/l	.1
Methoxychlor	.5	U	ug/l	.5	.5	UJ	ug/l	.5	.5	U	ug/l	.5	.5	UJ	ug/l	.5
Endrin ketone	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
Endrin aldehyde	.1	U	ug/l	.1	.1	UJ	ug/l	.1	.1	U	ug/l	.1	.1	UJ	ug/l	.1
alpha-Chlordane	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
gamma-Chlordane	.05	U	ug/l	.05	.05	UJ	ug/l	.05	.05	U	ug/l	.05	.05	UJ	ug/l	.05
Toxaphene	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5
Aroclor-1016	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1221	2	U	ug/l	2	2	UJ	ug/l	2	2	U	ug/l	2	2	UJ	ug/l	2
Aroclor-1232	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1242	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1248	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1254	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1
Aroclor-1260	1	U	ug/l	1	1	UJ	ug/l	1	1	U	ug/l	1	1	UJ	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING [illegible]D -- SITE 16
GROUNDWATER -- INORGANICS -- REPORT NO. 10502

Lab Sample Number:	90226004				90214002				90272002				90272001			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	WHF16-1				WHF16-2				WHF16-2B				WHF16-2C			
Collect Date:	16-NOV-93				24-NOV-93				06-DEC-93				06-DEC-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	27.2	J	ug/l	200	178	J	ug/l	200	12400		ug/l	200	25.1	J	ug/l	200
Antimony	20.7	U	ug/l	60	20.7	U	ug/l	60	20.7	U	ug/l	60	20.7	U	ug/l	60
Arsenic	1.7	J	ug/l	10	1.6	U	ug/l	10	1.6	U	ug/l	10	1.6	U	ug/l	10
Barium	31.5	J	ug/l	200	12.3	J	ug/l	200	77.8	J	ug/l	200	34.4	J	ug/l	200
Beryllium	.2	U	ug/l	5	.2	U	ug/l	5	.26	J	ug/l	5	.2	U	ug/l	5
Cadmium	3.2	U	ug/l	5	5		ug/l	5	3.2	U	ug/l	5	3.2	U	ug/l	5
Calcium	1090	J	ug/l	5000	859	J	ug/l	5000	785	J	ug/l	5000	2120	J	ug/l	5000
Chromium	3.3	U	ug/l	10	3.3	U	ug/l	10	35.5		ug/l	10	3.4	J	ug/l	10
Cobalt	4.1	U	ug/l	50	4.1	U	ug/l	50	5	J	ug/l	50	4.1	U	ug/l	50
Copper	8.2	J	ug/l	25	2.1	U	ug/l	25	14	J	ug/l	25	2.8	J	ug/l	25
Iron	34.5	J	ug/l	100	135		ug/l	100	12400		ug/l	100	545		ug/l	100
Lead	1.8	J	ug/l	3	1.3	J	ug/l	3	5.6		ug/l	3	1.6	J	ug/l	3
Magnesium	1020	J	ug/l	5000	534	J	ug/l	5000	1270	J	ug/l	5000	1400	J	ug/l	5000
Manganese	4.2	J	ug/l	15	20.5		ug/l	15	44.4		ug/l	15	115		ug/l	15
Mercury	.15	U	ug/l	.2	.15	U	ug/l	.2	.3	J	ug/l	.2	.16	J	ug/l	.2
Nickel	10.6	J	ug/l	40	9	U	ug/l	40	9	U	ug/l	40	9	U	ug/l	40
Potassium	852	J	ug/l	5000	614	U	ug/l	5000	1830	J	ug/l	5000	614	U	ug/l	5000
Selenium	2	U	ug/l	5	2	U	ug/l	5	2	U	ug/l	5	2	U	ug/l	5
Silver	2.7	U	ug/l	10	2.7	U	ug/l	10	2.7	U	ug/l	10	3.9	J	ug/l	10
Sodium	2300	J	ug/l	5000	6850		ug/l	5000	2930	J	ug/l	5000	3330	J	ug/l	5000
Thallium	.88	U	ug/l	10	.88	U	ug/l	10	.88	U	ug/l	10	.88	U	ug/l	10
Vanadium	2.5	U	ug/l	50	2.5	U	ug/l	50	37.3	J	ug/l	50	2.5	U	ug/l	50
Zinc	29		ug/l	20	6.5	J	ug/l	20	97.7		ug/l	20	8	J	ug/l	20
Cyanide	1.7	U	ug/l	10	1.7	J	ug/l	10	1.7	U	ug/l	10	1.7	U	ug/l	10

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NAS WHITING FIELD -- SITE 16

GROUNDWATER -- INORGANICS -- REPORT NO. 10502

Lab Sample Number:		90225001				90221002				90220001				90220002		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		WHF16-3B				WHF16-3C				WHF16-3D				WHF16-3DA		
Collect Date:		15-NOV-93				12-NOV-93				11-NOV-93				11-NOV-93		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	85000	U	ug/l	200	82600		ug/l	200	1370		ug/l	200	2590	J	ug/l	200
Antimony	104	U	ug/l	60	20.7	U	ug/l	60	20.7	U	ug/l	60	20.7	U	ug/l	60
Arsenic	4.5	J	ug/l	10	3.7	J	ug/l	10	1.9	J	ug/l	10	2	J	ug/l	10
Barium	105	J	ug/l	200	297		ug/l	200	19.1	J	ug/l	200	20.4	J	ug/l	200
Beryllium	4.7	J	ug/l	5	3.6	J	ug/l	5	.32	J	ug/l	5	.45	J	ug/l	5
Cadmium	16	U	ug/l	5	56.5		ug/l	5	3.2	U	ug/l	5	5.6		ug/l	5
Calcium	79400		ug/l	5000	23000		ug/l	5000	2410	J	ug/l	5000	2420	J	ug/l	5000
Chromium	219		ug/l	10	225		ug/l	10	4.3	J	ug/l	10	5.1	J	ug/l	10
Cobalt	21.3	J	ug/l	50	6.2	J	ug/l	50	4.1	U	ug/l	50	4.1	U	ug/l	50
Copper	43.6	J	ug/l	25	87.1		ug/l	25	2.6	J	ug/l	25	2.4	J	ug/l	25
Iron	313000		ug/l	100	83700		ug/l	100	923	J	ug/l	100	1230	J	ug/l	100
Lead	15.2		ug/l	3	69.1		ug/l	3	2.2	UJ	ug/l	3	2.4	UJ	ug/l	3
Magnesium	6780	J	ug/l	5000	8660		ug/l	5000	903	J	ug/l	5000	955	J	ug/l	5000
Manganese	1050		ug/l	15	498		ug/l	15	93.4		ug/l	15	94.1		ug/l	15
Mercury	.23		ug/l	.2	.48		ug/l	.2	.15	U	ug/l	.2	.15	U	ug/l	.2
Nickel	82.4	J	ug/l	40	38.5	J	ug/l	40	9	U	ug/l	40	9	U	ug/l	40
Potassium	7000	J	ug/l	5000	4780	J	ug/l	5000	1890	J	ug/l	5000	1770	J	ug/l	5000
Selenium	2	U	ug/l	5	2	U	ug/l	5	2	U	ug/l	2	2	U	ug/l	5
Silver	24.3	J	ug/l	10	2.7	U	ug/l	10	2.7	UJ	ug/l	10	2.7	UJ	ug/l	10
Sodium	6980	J	ug/l	5000	13500		ug/l	5000	23200		ug/l	5000	23000		ug/l	5000
Thallium	.88	U	ug/l	10	.88	U	ug/l	10	1	UJ	ug/l	10	.88	U	ug/l	10
Vanadium	987		ug/l	50	120		ug/l	50	4.4	J	ug/l	50	5	J	ug/l	50
Zinc	152		ug/l	20	451		ug/l	20	14.7	J	ug/l	20	17.8	J	ug/l	20
Cyanide	1.7	U	ug/l	10	1.9	J	ug/l	10	1.7	U	ug/l	10	1.7	U	ug/l	10

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Lab Sample Number:	90226001				90226002			
Site	WHITING				WHITING			
Locator	WHF16-4B				WHF16-4BA			
Collect Date:	16-NOV-93				16-NOV-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
P METALS AND CYANIDE								
Aluminum	6280		ug/l	200	5170		ug/l	200
Antimony	20.7	U	ug/l	60	20.7	U	ug/l	60
Arsenic	3.1	J	ug/l	10	1.6	U	ug/l	10
Barium	25.9	J	ug/l	200	26.3	J	ug/l	200
Beryllium	.2	U	ug/l	5	.2	U	ug/l	5
Cadmium	3.2	U	ug/l	5	3.2	U	ug/l	5
Calcium	91600		ug/l	5000	90300		ug/l	5000
Chromium	7	J	ug/l	10	7	J	ug/l	10
Cobalt	4.1	U	ug/l	50	4.1	U	ug/l	50
Copper	6.6	J	ug/l	25	6.5	J	ug/l	25
Iron	4640		ug/l	100	3370		ug/l	100
Lead	6.1		ug/l	3	4.7		ug/l	3
Magnesium	7840		ug/l	5000	7720		ug/l	5000
Manganese	81.1		ug/l	15	67.2		ug/l	15
Mercury	.15	U	ug/l	.2	.15	U	ug/l	.2
Nickel	9	U	ug/l	40	9	U	ug/l	40
Potassium	3360	J	ug/l	5000	3540	J	ug/l	5000
Selenium	2	U	ug/l	5	2	U	ug/l	5
Silver	2.7	U	ug/l	10	2.7	U	ug/l	10
Sodium	3270	J	ug/l	5000	3090	J	ug/l	5000
Thallium	.88	U	ug/l	10	.88	U	ug/l	10
Vanadium	14.2	J	ug/l	50	11.5	J	ug/l	50
Zinc	92.5		ug/l	20	68		ug/l	20
Cyanide	1.7	U	ug/l	10	1.7	U	ug/l	10

Lab Sample Number:	90226003				90225002			
Site	WHITING				WHITING			
Locator	WHF16-4CD				WHF16-4D			
Collect Date:	16-NOV-93				15-NOV-93			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
P METALS AND CYANIDE								
Aluminum	111	J	ug/l	200	779	U	ug/l	200
Antimony	20.7	U	ug/l	60	20.7	U	ug/l	60
Arsenic	1.6	U	ug/l	10	1.6	U	ug/l	10
Barium	15.7	J	ug/l	200	20.3	J	ug/l	200
Beryllium	.2	U	ug/l	5	.2	U	ug/l	5
Cadmium	3.9	J	ug/l	5	3.2	U	ug/l	5
Calcium	1970	J	ug/l	5000	6350		ug/l	5000
Chromium	3.3	U	ug/l	10	3.8	J	ug/l	10
Cobalt	4.1	U	ug/l	50	4.1	U	ug/l	50
Copper	2.1	U	ug/l	25	2.1	U	ug/l	25
Iron	140		ug/l	100	223		ug/l	100
Lead	1	U	ug/l	3	1.2	J	ug/l	3
Magnesium	459	J	ug/l	5000	528	J	ug/l	5000
Manganese	18.2		ug/l	15	59.1		ug/l	15
Mercury	.15	U	ug/l	.2	.15	U	ug/l	.2
Nickel	9	U	ug/l	40	9	U	ug/l	40
Potassium	614	U	ug/l	5000	614	U	ug/l	5000
Selenium	2	U	ug/l	5	2	U	ug/l	5
Silver	2.7	U	ug/l	10	2.7	U	ug/l	10
Sodium	3690	J	ug/l	5000	3180	J	ug/l	5000
Thallium	.88	U	ug/l	10	.88	U	ug/l	10
Vanadium	2.5	U	ug/l	50	3.5	J	ug/l	50
Zinc	25.7		ug/l	20	3.3	J	ug/l	20
Cyanide	1.7	U	ug/l	10	1.7	U	ug/l	10

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NAS WHITING FIELD -- SITE 16
GROUNDWATER -- INORGANICS -- REPORT NO. 10502

Lab Sample Number:	90236003				RC016004				WTME340009				WTME340010			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	WHF16-5				16G00101				16G00101				16G00101D			
Collect Date:	17-NOV-93				19-AUG-96				24-JUL-97				24-JUL-97			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	64.8	J	ug/l	200	18.2	U	ug/l		200	U	ug/l	200	200	U	ug/l	200
Antimony	20.7	U	ug/l	60	8.6	U	ug/l		60	U	ug/l	60	60	U	ug/l	60
Arsenic	1.6	U	ug/l	10	.5	U	ug/l		10	U	ug/l	10	10	U	ug/l	10
Barium	7.9	J	ug/l	200	24.1	J	ug/l		20.5	J	ug/l	200	20.7	J	ug/l	200
Beryllium	.2	U	ug/l	5	.3	U	ug/l		5	U	ug/l	5	5	U	ug/l	5
Cadmium	3.2	U	ug/l	5	1.2	U	ug/l		5	U	ug/l	5	5	U	ug/l	5
Calcium	157	J	ug/l	5000	623	J	ug/l		5000	U	ug/l	5000	5000	U	ug/l	5000
Chromium	3.3	U	ug/l	10	2.1	J	ug/l		10	U	ug/l	10	10	U	ug/l	10
Cobalt	4.1	U	ug/l	50	2.3	U	ug/l		50	U	ug/l	50	50	U	ug/l	50
Copper	2.1	U	ug/l	25	1.1	U	ug/l		25	U	ug/l	25	25	U	ug/l	25
Iron	35	J	ug/l	100	39.9	J	ug/l		100	U	ug/l	100	100	U	ug/l	100
Lead	1	U	ug/l	3	2.1	U	ug/l		3	U	ug/l	3	3	U	ug/l	3
Magnesium	270	J	ug/l	5000	685	J	ug/l		617	J	ug/l	5000	623	J	ug/l	5000
Manganese	1.7	J	ug/l	15	3.8	J	ug/l		15	U	ug/l	15	15	U	ug/l	15
Mercury	.15	U	ug/l	.2	.1	U	ug/l		.2	U	ug/l	.2	.2	U	ug/l	.2
Nickel	9	U	ug/l	40	7.3	U	ug/l		40	U	ug/l	40	40	U	ug/l	40
Potassium	614	U	ug/l	5000	375	J	ug/l		5000	U	ug/l	5000	5000	U	ug/l	5000
Selenium	2	U	ug/l	5	.6	U	ug/l		5	UJ	ug/l	5	5	U	ug/l	5
Silver	2.7	U	ug/l	10	2.5	U	ug/l		10	U	ug/l	10	10	U	ug/l	10
Sodium	1630	J	ug/l	5000	1860	J	ug/l		2130	J	ug/l	5000	2110	J	ug/l	5000
Thallium	.88	U	ug/l	10	.6	U	ug/l		10	U	ug/l	10	10	U	ug/l	10
Vanadium	2.5	U	ug/l	50	1.5	U	ug/l		50	U	ug/l	50	50	U	ug/l	50
Zinc	2.2	J	ug/l	20	114		ug/l		20	U	ug/l	20	20	U	ug/l	20
Cyanide	1.7	U	ug/l	10	1.5	U	ug/l		-				-			

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NAS WHITING [illegible]D -- SITE 16
GROUNDWATER -- INORGANICS -- REPORT NO. 10502

Lab Sample Number:	RB980014				RB980006				RB980016				WTME322004			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00201F				16G00201				16G00202				16G00202			
Collect Date:	13-AUG-96				14-AUG-96				15-AUG-96				22-JUL-97			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	21	U	ug/l		66.7	U	ug/l		11.1	U	ug/l		200	U	ug/l	200
Antimony	8.6	U	ug/l		8.6	U	ug/l		8.6	U	ug/l		60	U	ug/l	60
Arsenic	.5	U	ug/l		.5	U	ug/l		.5	U	ug/l		10	U	ug/l	10
Barium	17.4	J	ug/l		17.4	J	ug/l		30.1	J	ug/l		45.2	J	ug/l	200
Beryllium	.3	U	ug/l		.3	U	ug/l		.3	U	ug/l		5	U	ug/l	5
Cadmium	1.2	U	ug/l		1.2	U	ug/l		1.2	U	ug/l		5	U	ug/l	5
Calcium	320	U	ug/l		308	U	ug/l		1990	J	ug/l		3660	J	ug/l	5000
Chromium	2	U	ug/l		2	U	ug/l		2	U	ug/l		10	U	ug/l	10
Cobalt	2.3	U	ug/l		3	J	ug/l		2.3	U	ug/l		50	U	ug/l	50
Copper	1.1	U	ug/l		1.1	U	ug/l		1.1	U	ug/l		25	U	ug/l	25
Iron	5	U	ug/l		41.2	U	ug/l		57.2	U	ug/l		100	U	ug/l	100
Lead	.5	U	ug/l		.5	U	ug/l		2.3	J	ug/l		3	U	ug/l	3
Magnesium	464	J	ug/l		484	J	ug/l		1450	J	ug/l		3020	J	ug/l	5000
Manganese	2.5	J	ug/l		2.1	J	ug/l		12	J	ug/l		21.8		ug/l	15
Mercury	.1	U	ug/l		.1	U	ug/l		.1	U	ug/l		.2	U	ug/l	.2
Nickel	7.3	U	ug/l		7.3	U	ug/l		7.3	U	ug/l		40	U	ug/l	40
Potassium	316	U	ug/l		476	J	ug/l		331	J	ug/l		5000	U	ug/l	5000
Selenium	.6	U	ug/l		.6	U	ug/l		.6	U	ug/l		5	U	ug/l	5
Silver	2.5	U	ug/l		2.5	U	ug/l		2.5	U	ug/l		10	U	ug/l	10
Sodium	2670	J	ug/l		2690	J	ug/l		5260		ug/l		4300	J	ug/l	5000
Thallium	.6	U	ug/l		.6	U	ug/l		.6	U	ug/l		10	UJ	ug/l	10
Vanadium	1.2	U	ug/l		1.2	U	ug/l		1.2	U	ug/l		50	U	ug/l	50
Zinc	2.5	U	ug/l		1.5	U	ug/l		168		ug/l		20	U	ug/l	20
Cyanide	-		ug/l		2.2	U	ug/l		1.6	U	ug/l		-			

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NAS WHITING FIELD -- SITE 16
GROUNDWATER -- INORGANICS -- REPORT NO. 10502

Lab Sample Number:	RB980017				WTME322005			
Site	WHITING				WHITING			
Locator	16G00203				16G00203			
Collect Date:	15-AUG-96				23-JUL-97			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE								
Aluminum	17.7	U	ug/l		121	J	ug/l	200
Antimony	8.6	U	ug/l		60	U	ug/l	60
Arsenic	.5	U	ug/l		10	U	ug/l	10
Barium	21.5	J	ug/l		17.4	J	ug/l	200
Beryllium	.3	U	ug/l		5	U	ug/l	5
Cadmium	1.2	U	ug/l		5	U	ug/l	5
Calcium	1000	J	ug/l		1080	J	ug/l	5000
Chromium	2	U	ug/l		10	U	ug/l	10
Cobalt	2.3	U	ug/l		50	U	ug/l	50
Copper	1.1	U	ug/l		25	U	ug/l	25
Iron	30.2	U	ug/l		100	U	ug/l	100
Lead	.5	U	ug/l		3	U	ug/l	3
Magnesium	732	J	ug/l		659	J	ug/l	5000
Manganese	36.9		ug/l		41.4		ug/l	15
Mercury	.1	U	ug/l		.2	U	ug/l	.2
Nickel	7.3	U	ug/l		40	U	ug/l	40
Potassium	322	J	ug/l		5000	U	ug/l	5000
Selenium	.6	U	ug/l		5	U	ug/l	5
Silver	2.5	U	ug/l		10	U	ug/l	10
Sodium	2160	J	ug/l		2080	J	ug/l	5000
Thallium	.6	U	ug/l		10	U	ug/l	10
Vanadium	1.2	U	ug/l		50	U	ug/l	50
Zinc	4.9	U	ug/l		20	U	ug/l	20
Cyanide	1.6	U	ug/l		-			

Lab Sample Number:	RC016005				WTME340008			
Site	WHITING				WHITING			
Locator	16G00301				16G00301			
Collect Date:	20-AUG-96				24-JUL-97			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE								
Aluminum	73.3	U	ug/l		749		ug/l	200
Antimony	8.6	U	ug/l		60	U	ug/l	60
Arsenic	.5	U	ug/l		10	U	ug/l	10
Barium	40.7	J	ug/l		39.3	J	ug/l	200
Beryllium	.3	U	ug/l		5	U	ug/l	5
Cadmium	1.2	U	ug/l		5	U	ug/l	5
Calcium	24900		ug/l		35700		ug/l	5000
Chromium	2	U	ug/l		10	U	ug/l	10
Cobalt	2.3	U	ug/l		50	U	ug/l	50
Copper	1.1	U	ug/l		25	U	ug/l	25
Iron	176		ug/l		1040		ug/l	100
Lead	.5	U	ug/l		3	U	ug/l	3
Magnesium	2850	J	ug/l		3450	J	ug/l	5000
Manganese	3	J	ug/l		12.1	J	ug/l	15
Mercury	.1	U	ug/l		.2	U	ug/l	.2
Nickel	7.3	U	ug/l		40	U	ug/l	40
Potassium	3730	J	ug/l		3510	J	ug/l	5000
Selenium	.6	U	ug/l		5	U	ug/l	5
Silver	2.5	U	ug/l		10	U	ug/l	10
Sodium	4750	J	ug/l		6660		ug/l	5000
Thallium	.6	U	ug/l		10	UJ	ug/l	10
Vanadium	1.7	U	ug/l		50	U	ug/l	50
Zinc	2.2	U	ug/l		20	U	ug/l	20
Cyanide	1.5	U	ug/l		-			

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NAS WHITING FIELD -- SITE 16
GROUNDWATER -- INORGANICS -- REPORT NO. 10502

Lab Sample Number:	RC016006				WTME322002				RC016008				WTME322003			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00302				16G00302				16G00303				16G00303			
Collect Date:	20-AUG-96				22-JUL-97				21-AUG-96				22-JUL-97			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	82.5	U	ug/l		200	U	ug/l	200	395		ug/l		222		ug/l	200
Antimony	8.6	U	ug/l		60	U	ug/l	60	8.6	U	ug/l		17.4	J	ug/l	60
Arsenic	.5	U	ug/l		10	U	ug/l	10	1.1	U	ug/l		10	U	ug/l	10
Barium	23.5	J	ug/l		25.3	J	ug/l	200	27.2	J	ug/l		26.6	J	ug/l	200
Beryllium	.3	U	ug/l		5	U	ug/l	5	.3	U	ug/l		5	U	ug/l	5
Cadmium	1.2	U	ug/l		5	U	ug/l	5	1.2	U	ug/l		5	U	ug/l	5
Calcium	1060	J	ug/l		997	J	ug/l	5000	1070	J	ug/l		1380	J	ug/l	5000
Chromium	2.6	J	ug/l		10	U	ug/l	10	4.6	J	ug/l		10	U	ug/l	10
Cobalt	2.3	U	ug/l		50	U	ug/l	50	2.3	U	ug/l		50	U	ug/l	50
Copper	1.1	U	ug/l		25	U	ug/l	25	1.7	J	ug/l		25	U	ug/l	25
Iron	113		ug/l		100	U	ug/l	100	1410		ug/l		1370		ug/l	100
Lead	.9	U	ug/l		3	U	ug/l	3	2.6	U	ug/l		3	U	ug/l	3
Magnesium	720	J	ug/l		790	J	ug/l	5000	1030	J	ug/l		1220	J	ug/l	5000
Manganese	47.3		ug/l		18		ug/l	15	60.3		ug/l		89.6		ug/l	15
Mercury	.1	U	ug/l		.2	U	ug/l	.2	.11	U	ug/l		.2	U	ug/l	.2
Nickel	7.3	U	ug/l		40	U	ug/l	40	7.3	U	ug/l		40	U	ug/l	40
Potassium	401	J	ug/l		1180	J	ug/l	5000	316	U	ug/l		5000	U	ug/l	5000
Selenium	.6	U	ug/l		5	U	ug/l	5	.6	U	ug/l		5	U	ug/l	5
Silver	2.5	U	ug/l		10	U	ug/l	10	2.5	U	ug/l		10	U	ug/l	10
Sodium	2490	J	ug/l		3470	J	ug/l	5000	4570	J	ug/l		3940	J	ug/l	5000
Thallium	.6	U	ug/l		10	UJ	ug/l	10	.6	U	ug/l		10	UJ	ug/l	10
Vanadium	1.2	U	ug/l		50	U	ug/l	50	3.6	U	ug/l		50	U	ug/l	50
Zinc	6.2	U	ug/l		20	U	ug/l	20	3	U	ug/l		20	U	ug/l	20
Cyanide	1.5	U	ug/l		-				1.5	U	ug/l		-			

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R= RESULT IS REJECTED AND UNUSABLE

NAS WHITING FIELD -- SITE 16
GROUNDWATER -- INORGANICS -- REPORT NO. 10502

Lab Sample Number:	RC016010				RC016007				WTME340006				WSME340007			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00303F				16G00304				16G00304				16G00304F			
Collect Date:	21-AUG-96				20-AUG-96				24-JUL-97				24-JUL-97			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	25.4	U	ug/l		90.7	J	ug/l		1900		ug/l	200	98.4	J	ug/l	200
Antimony	8.6	U	ug/l		10	U	ug/l		60	U	ug/l	60	60	U	ug/l	60
Arsenic	.5	U	ug/l		1.5	U	ug/l		10	U	ug/l	10	1.4	J	ug/l	10
Barium	18.9	J	ug/l		13	J	ug/l		16	J	ug/l	200	11	J	ug/l	200
Beryllium	.3	U	ug/l		.3	U	ug/l		5	U	ug/l	5	5	U	ug/l	5
Cadmium	1.2	U	ug/l		1.2	U	ug/l		5	U	ug/l	5	5	U	ug/l	5
Calcium	962	J	ug/l		2500	J	ug/l		2960	J	ug/l	5000	2540	J	ug/l	5000
Chromium	3.4	J	ug/l		2	U	ug/l		10	U	ug/l	10	10	U	ug/l	10
Cobalt	2.3	U	ug/l		2.3	U	ug/l		50	U	ug/l	50	50	U	ug/l	50
Copper	1.1	U	ug/l		1.1	U	ug/l		11.9	J	ug/l	25	25	U	ug/l	25
Iron	396		ug/l		111		ug/l		1040		ug/l	100	100	U	ug/l	100
Lead	.5	U	ug/l		.5	U	ug/l		3	U	ug/l	3	3	U	ug/l	3
Magnesium	893	J	ug/l		988	J	ug/l		1220	J	ug/l	5000	1030	J	ug/l	5000
Manganese	53.3		ug/l		73.7		ug/l		105		ug/l	15	80.4		ug/l	15
Mercury	.1	U	ug/l		.1	U	ug/l		.2	U	ug/l	.2	.2	U	ug/l	.2
Nickel	7.3	U	ug/l		7.7	J	ug/l		40	U	ug/l	40	40	U	ug/l	40
Potassium	316	U	ug/l		1640	J	ug/l		2010	J	ug/l	5000	1720	J	ug/l	5000
Selenium	.6	U	ug/l		.6	U	ug/l		5	U	ug/l	5	5	U	ug/l	5
Silver	2.5	U	ug/l		2.5	U	ug/l		10	U	ug/l	10	10	U	ug/l	10
Sodium	4590	J	ug/l		20600		ug/l		20400		ug/l	5000	20700		ug/l	5000
Thallium	.6	U	ug/l		.6	U	ug/l		10	U	ug/l	10	10	UJ	ug/l	10
Vanadium	1.2	U	ug/l		1.5	U	ug/l		50	U	ug/l	50	50	U	ug/l	50
Zinc	3.9	U	ug/l		53.1		ug/l		26.7		ug/l	20	20	U	ug/l	20
Cyanide	-		ug/l		1.5	U	ug/l		-				-			

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NAS WHITING [illegible]D -- SITE 16
GROUNDWATER -- INORGANICS -- REPORT NO. 10502

Lab Sample Number:	RC016002				RC016003				RB980020				RB980021			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00401				16G00402				16G00403				16G00403D			
Collect Date:	19-AUG-96				19-AUG-96				16-AUG-96				16-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	52.8	U	ug/l		34.1	U	ug/l		278		ug/l		290		ug/l	
Antimony	10.7	U	ug/l		8.6	U	ug/l		8.6	U	ug/l		8.6	U	ug/l	
Arsenic	.6	J	ug/l		.5	U	ug/l		1	J	ug/l		.5	U	ug/l	
Barium	59.4	J	ug/l		57.7	J	ug/l		28.6	J	ug/l		27.5	J	ug/l	
Beryllium	.42	J	ug/l		.3	U	ug/l		.3	U	ug/l		.3	U	ug/l	
Cadmium	12.5		ug/l		1.2	U	ug/l		1.2	U	ug/l		1.2	U	ug/l	
Calcium	78800		ug/l		8460		ug/l		3110	J	ug/l		3300	J	ug/l	
Chromium	2	U	ug/l		2	U	ug/l		2.3	J	ug/l		2.9	J	ug/l	
Cobalt	2.3	U	ug/l		2.3	U	ug/l		2.3	U	ug/l		2.3	U	ug/l	
Copper	1.7	J	ug/l		1.4	J	ug/l		1.1	U	ug/l		1.3	J	ug/l	
Iron	167		ug/l		57.5	J	ug/l		1370		ug/l		879		ug/l	
Lead	.5	U	ug/l		.8	U	ug/l		4		ug/l		2.7	J	ug/l	
Magnesium	8690		ug/l		542	J	ug/l		1320	J	ug/l		987	J	ug/l	
Manganese	65.4		ug/l		7	J	ug/l		41.3		ug/l		33.5		ug/l	
Mercury	.1	U	ug/l		.1	U	ug/l		.1	U	ug/l		.1	U	ug/l	
Nickel	7.3	U	ug/l		7.3	U	ug/l		7.3	U	ug/l		7.3	U	ug/l	
Potassium	4790	J	ug/l		316	U	ug/l		540	J	ug/l		713	J	ug/l	
Selenium	.6	U	ug/l		.6	U	ug/l		.6	U	ug/l		.6	U	ug/l	
Silver	2.5	U	ug/l		2.5	U	ug/l		2.5	U	ug/l		2.5	U	ug/l	
Sodium	3490	J	ug/l		3210	J	ug/l		2570	J	ug/l		2590	J	ug/l	
Thallium	.6	U	ug/l		.6	U	ug/l		.6	U	ug/l		.6	U	ug/l	
Vanadium	3.4	U	ug/l		1.2	U	ug/l		2.2	J	ug/l		1.2	U	ug/l	
Zinc	50.7		ug/l		381		ug/l		103		ug/l		945		ug/l	
Cyanide	1.5	U	ug/l		1.5	U	ug/l		2.9	U	ug/l		1.6	U	ug/l	

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NAS WHITING FIELD -- SITE 16
GROUNDWATER -- INORGANICS -- REPORT NO. 10502

Lab Sample Number:	RB980023				RC016009				RC016013				RC016011			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00403F				16G00501				16G00501D				16G00501F			
Collect Date:	16-AUG-96				21-AUG-96				21-AUG-96				21-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	128	J	ug/l		12.6	U	ug/l		16.7	U	ug/l		41.9	U	ug/l	
Antimony	8.6	U	ug/l		8.6	U	ug/l		8.6	U	ug/l		8.6	U	ug/l	
Arsenic	.5	J	ug/l		.5	U	ug/l		.5	U	ug/l		.7	U	ug/l	
Barium	27.5	J	ug/l		10	J	ug/l		10	J	ug/l		10	J	ug/l	
Beryllium	.3	U	ug/l		.3	U	ug/l		.3	U	ug/l		.3	U	ug/l	
Cadmium	1.2	U	ug/l		1.2	U	ug/l		1.2	U	ug/l		1.2	U	ug/l	
Calcium	3680	J	ug/l		239	U	ug/l		234	U	ug/l		287	U	ug/l	
Chromium	2	U	ug/l		2	U	ug/l		2	U	ug/l		2	U	ug/l	
Cobalt	2.3	U	ug/l		3.2	J	ug/l		2.3	U	ug/l		2.3	U	ug/l	
Copper	1.1	U	ug/l		1.1	U	ug/l		1.1	U	ug/l		1.1	U	ug/l	
Iron	1050		ug/l		9.2	J	ug/l		5.3	J	ug/l		119		ug/l	
Lead	3.3		ug/l		.5	U	ug/l		.5	U	ug/l		.5	U	ug/l	
Magnesium	1230	J	ug/l		276	J	ug/l		261	J	ug/l		305	J	ug/l	
Manganese	38.8		ug/l		1	U	ug/l		2.1	J	ug/l		3	J	ug/l	
Mercury	.1	U	ug/l		.1	U	ug/l		.1	U	ug/l		.1	U	ug/l	
Nickel	7.3	U	ug/l		7.3	U	ug/l		7.3	U	ug/l		7.3	U	ug/l	
Potassium	513	J	ug/l		316	U	ug/l		316	U	ug/l		471	J	ug/l	
Selenium	.6	U	ug/l		.6	U	ug/l		.6	U	ug/l		.6	U	ug/l	
Silver	2.5	U	ug/l		2.5	U	ug/l		2.5	U	ug/l		2.5	U	ug/l	
Sodium	2630	J	ug/l		1550	J	ug/l		1450	J	ug/l		1510	J	ug/l	
Thallium	.6	U	ug/l		.6	U	ug/l		.6	U	ug/l		.6	U	ug/l	
Vanadium	1.2	U	ug/l		1.2	U	ug/l		1.2	U	ug/l		1.2	U	ug/l	
Zinc	332		ug/l		2.6	U	ug/l		1.6	U	ug/l		5	U	ug/l	
Cyanide	-		ug/l		1.5	U	ug/l		1.5	U	ug/l		-		ug/l	

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Lab Sample Number:	RB980019				WTME340002				RB980022				WSME340003			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00601				16G00601				16G00601F				16G00601F			
Collect Date:	16-AUG-96				23-JUL-97				16-AUG-96				23-JUL-97			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	3040		ug/l		3930		ug/l	200	42.3	U	ug/l		200	U	ug/l	200
Antimony	8.6	U	ug/l		60	U	ug/l	60	8.6	U	ug/l		124		ug/l	60
Arsenic	.8	J	ug/l		10	U	ug/l	10	.5	U	ug/l		10	U	ug/l	10
Barium	300		ug/l		456		ug/l	200	251		ug/l		310		ug/l	200
Beryllium	.3	U	ug/l		5	U	ug/l	5	.32	J	ug/l		10.3		ug/l	5
Cadmium	2.2	J	ug/l		5	U	ug/l	5	1.2	U	ug/l		5	U	ug/l	5
Calcium	61900		ug/l		74300		ug/l	5000	61900		ug/l		72800		ug/l	5000
Chromium	2	U	ug/l		10	U	ug/l	10	2	U	ug/l		10	U	ug/l	10
Cobalt	2.3	U	ug/l		50	U	ug/l	50	2.3	U	ug/l		50	U	ug/l	50
Copper	6.1	J	ug/l		25	U	ug/l	25	1.1	U	ug/l		25	U	ug/l	25
Iron	45200		ug/l		68600		ug/l	100	1660		ug/l		656		ug/l	100
Lead	5.7		ug/l		3	U	ug/l	3	.5	U	ug/l		3	U	ug/l	3
Magnesium	3100	J	ug/l		3680	J	ug/l	5000	3110	J	ug/l		3680	J	ug/l	5000
Manganese	516		ug/l		1370		ug/l	15	425		ug/l		43.2		ug/l	15
Mercury	.1	U	ug/l		.2	U	ug/l	.2	.1	U	ug/l		.2	U	ug/l	.2
Nickel	7.3	U	ug/l		40	U	ug/l	40	7.3	U	ug/l		40	U	ug/l	40
Potassium	2010	J	ug/l		3030	J	ug/l	5000	2110	J	ug/l		3110	J	ug/l	5000
Selenium	.6	U	ug/l		5	UJ	ug/l	5	.6	U	ug/l		5	UJ	ug/l	5
Silver	2.5	U	ug/l		10	U	ug/l	10	2.5	U	ug/l		10	U	ug/l	10
Sodium	1600	J	ug/l		2730	J	ug/l	5000	1650	J	ug/l		2940	J	ug/l	5000
Thallium	.6	U	ug/l		10	U	ug/l	10	.6	U	ug/l		10	U	ug/l	10
Vanadium	17.8	J	ug/l		25.2	J	ug/l	50	2.2	J	ug/l		50	U	ug/l	50
Zinc	56.4		ug/l		49.1		ug/l	20	6.5	U	ug/l		20	U	ug/l	20
Cyanide	12		ug/l		-				-		ug/l		-			

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NAS WHITING FIELD -- SITE 16
GROUNDWATER -- INORGANICS -- REPORT NO. 10502

Lab Sample Number:		RB980018				WTME340004				RB887015				WTME348004		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		16G00602				16G00602				16G00701				16G00701		
Collect Date:		15-AUG-96				23-JUL-97				25-JUL-96				25-JUL-97		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	244		ug/l		200	J	ug/l	200	137	J	ug/l		161	J	ug/l	200
Antimony	8.6	U	ug/l		60	U	ug/l	60	8.6	U	ug/l		60	U	ug/l	60
Arsenic	.5	U	ug/l		10	U	ug/l	10	.5	U	ug/l		10	U	ug/l	10
Barium	17.4	J	ug/l		30.9	J	ug/l	200	27.4	J	ug/l		32.9	J	ug/l	200
Beryllium	.3	U	ug/l		5	U	ug/l	5	.3	U	ug/l		5	U	ug/l	5
Cadmium	1.2	U	ug/l		5	U	ug/l	5	1.2	U	ug/l		5	U	ug/l	5
Calcium	1740	J	ug/l		1070	J	ug/l	5000	36000		ug/l		30500		ug/l	5000
Chromium	2	U	ug/l		10	U	ug/l	10	2	U	ug/l		10	U	ug/l	10
Cobalt	2.3	U	ug/l		50	U	ug/l	50	2.3	U	ug/l		50	U	ug/l	50
Copper	2.6	J	ug/l		25	U	ug/l	25	1.1	U	ug/l		25	U	ug/l	25
Iron	232		ug/l		100	U	ug/l	100	328		ug/l		1770		ug/l	100
Lead	.5	J	ug/l		3	U	ug/l	3	.5	U	ug/l		3	U	ug/l	3
Magnesium	590	J	ug/l		985	J	ug/l	5000	3050	J	ug/l		2850	J	ug/l	5000
Manganese	70.8		ug/l		10.9	J	ug/l	15	10.5	J	ug/l		1210		ug/l	15
Mercury	.1	U	ug/l		.2	U	ug/l	.2	.1	U	ug/l		.2	U	ug/l	.2
Nickel	7.3	U	ug/l		40	U	ug/l	40	8.7	J	ug/l		40	U	ug/l	40
Potassium	458	J	ug/l		5000	U	ug/l	5000	3470	J	ug/l		2850	J	ug/l	5000
Selenium	.6	U	ug/l		5	U	ug/l	5	.6	U	ug/l		5	UJ	ug/l	5
Silver	2.5	U	ug/l		10	U	ug/l	10	2.5	U	ug/l		10	U	ug/l	10
Sodium	3680	J	ug/l		2720	J	ug/l	5000	6210		ug/l		7490		ug/l	5000
Thallium	.6	U	ug/l		10	U	ug/l	10	.6	U	ug/l		10	UJ	ug/l	10
Vanadium	1.5	J	ug/l		50	U	ug/l	50	1.3	J	ug/l		50	U	ug/l	50
Zinc	210		ug/l		20	U	ug/l	20	1.2	U	ug/l		20	U	ug/l	20
Cyanide	3.5	U	ug/l		-				4.5	U	ug/l		-			

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NAS WHITING FIELD -- SITE 16
GROUNDWATER -- INORGANICS -- REPORT NO. 10502

Lab Sample Number:	RB887016				WTME348002				RB887017				WTME348003			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	16G00702				16G00702				16G00703				16G00703			
Collect Date:	25-JUL-96				25-JUL-97				25-JUL-96				25-JUL-97			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	72.3	J	ug/l		202		ug/l	200	196	J	ug/l		200	U	ug/l	200
Antimony	8.6	U	ug/l		60	U	ug/l	60	8.6	U	ug/l		60	U	ug/l	60
Arsenic	.5	U	ug/l		10	U	ug/l	10	2	J	ug/l		3.6	J	ug/l	10
Barium	15.6	J	ug/l		17.1	J	ug/l	200	10.8	J	ug/l		16.6	J	ug/l	200
Beryllium	.3	U	ug/l		5	U	ug/l	5	.3	U	ug/l		5	U	ug/l	5
Cadmium	1.2	U	ug/l		5	U	ug/l	5	1.2	U	ug/l		5	U	ug/l	5
Calcium	1960	J	ug/l		1210	J	ug/l	5000	2510	J	ug/l		3080	J	ug/l	5000
Chromium	2	U	ug/l		10	U	ug/l	10	2	U	ug/l		10	U	ug/l	10
Cobalt	2.3	U	ug/l		50	U	ug/l	50	2.3	U	ug/l		50	U	ug/l	50
Copper	1.1	U	ug/l		25	U	ug/l	25	1.1	U	ug/l		25	U	ug/l	25
Iron	201		ug/l		526		ug/l	100	151		ug/l		1200		ug/l	100
Lead	.6	U	ug/l		3	U	ug/l	3	.8	U	ug/l		3	U	ug/l	3
Magnesium	612	J	ug/l		673	J	ug/l	5000	496	J	ug/l		818	J	ug/l	5000
Manganese	85		ug/l		34.3		ug/l	15	102		ug/l		170		ug/l	15
Mercury	.1	U	ug/l		.2	U	ug/l	.2	.1	U	ug/l		.2	U	ug/l	.2
Nickel	7.3	U	ug/l		40	U	ug/l	40	7.3	U	ug/l		8.2	J	ug/l	40
Potassium	316	U	ug/l		5000	U	ug/l	5000	930	J	ug/l		5000	U	ug/l	5000
Selenium	.6	U	ug/l		5	U	ug/l	5	.6	U	ug/l		5	U	ug/l	5
Silver	2.5	U	ug/l		10	U	ug/l	10	2.5	U	ug/l		10	U	ug/l	10
Sodium	4100	J	ug/l		3880	J	ug/l	5000	18500		ug/l		2680	J	ug/l	5000
Thallium	.6	U	ug/l		10	UJ	ug/l	10	.6	U	ug/l		10	U	ug/l	10
Vanadium	1.2	U	ug/l		50	U	ug/l	50	1.2	U	ug/l		50	U	ug/l	50
Zinc	2.8	U	ug/l		20	U	ug/l	20	2.8	U	ug/l		20	U	ug/l	20
Cyanide	5.2	U	ug/l		-				2.6	U	ug/l		-			

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

APPENDIX G

HUMAN HEALTH RISK DATA

Table G-1
Screening Concentrations for Surface Soil
for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Chemical	Risk Based Screening Concentration[1]	Florida Cleanup Target Level[2]	Florida Cleanup Target Level Based on Leaching	Selected Screening Concentration[3]
Volatile Organic Compounds (μg/kg)				
Toluene	1,600,000	380,000	500	380,000
Xylenes (total)	16,000,000	5,900,000	200	5,900,000
Semivolatile Organic Compounds (μg/kg)				
Anthracene	2,300,000	18,000,000	2,500,000	2,300,000
Benzo(a)anthracene	870	1,400	3,200	870
Benzo(a)pyrene	87	100	8,000	87
Benzo(b)fluoranthene	870	1,400	10,000	870
Benzo(g,h,i)perylene	[4]230,000	2,300	3,200,000	2,300
Benzo(k)fluoranthene	8,700	15,000	25,000	8,700
bis(2-Ethylhexyl)phthalate	46,000	76,000	3,600,000	46,000
Carbazole	32,000	53,000	600	32,000
Chrysene	87,000	140,000	77,000	87,000
Dibenz(a,h)anthracene	87	100	30,000	87
Fluoranthene	310,000	2,900,000	1,200,000	310,000
Indeno(1,2,3-c,d)pyrene	870	1,500	28,000	870
Phenanthrene	[4]230,000	2,000,000	250,000	230,000
Pyrene	230,000	2,200,000	880,000	230,000
Pesticides and PCBs (μg/kg)				
4,4'-DDD	2,700	4,600	4,000	2,700
4,4'-DDE	1,900	3,300	18,000	1,900
4,4'-DDT	1,900	3,300	11,000	1,900
Aroclor-1254	320	[5]500	[5]17,000	320
Aroclor-1260	[5]320	[5]500	[5]17,000	320

See notes at end of table

Table G-1 (Continued)
Screening Concentrations for Surface Soil for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Chemical	Risk Based Screening Concentration[1]	Florida Cleanup Target Level[2]	Florida Cleanup Target Level Based on Leaching	Selected Screening Concentration[3]
Pesticides and PCBs (μg/kg) **(Continued)**				
Dieldrin	40	70	4	40
alpha-Chlordane	[6]1,800	[6]3,100	[6]9,600	1,800
gamma-Chlordane	[6]1,800	[6]3,100	[6]9,600	1,800
Inorganic Analytes (mg/kg)				
Aluminum	7,800	72,000	NC	7,800
Antimony	3.1	26	5	3.1
Arsenic	[7]0.43	0.8	29	0.43
Barium	550	110	1,600	110
Beryllium	16	120	63	16
Cadmium	3.9	75	8	3.9
Calcium	[8]1,000,000	NSC	NC	1,000,000
Chromium	[9]23	[9]210	38	23
Cobalt	470	4,700	NC	470
Copper	310	110	NC	110
Cyanide	[10]160	30	NC	30
Iron	2,300	23,000	NC	2,300
Lead	[11]400	400	NC	400
Magnesium	[8]460,468	NSC	NC	460,468
Manganese	160	1,600	NC	160
Mercury	2.3	3.4	2.1	2.3
Nickel	160	110	130	110
Potassium	[8]1,000,000	NSC	NC	1,000,000
Selenium	39	390	5	39
Silver	39	390	17	39

See notes at end of table

Table G-1 (Continued)
Screening Concentrations for Surface Soil for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Chemical	Risk Based Screening Concentration[1]	Florida Cleanup Target Level[2]	Florida Cleanup Target Level based on Leaching	Selected Screening Concentration[3]
Inorganic Analytes (mg/kg) (Continued)				
Sodium	[8]1,000,000	NSC	NC	1,000,000
Thallium	[12]5.5	NSC	NC	5.5
Vanadium	55	15	980	15
Zinc	2,300	23,000	6,000	2,300

[1] For all chemicals except the essential nutrients, the U.S. Environmental Protection Agency Region III Risk Based concentration (RBC) Table for residential soil (October 1998) has been used, unless otherwise noted. Screening values are based on a cancer risk of 1×10^{-6} or a hazard quotient of 1.0. Noncarcinogenic RBCs have been adjusted to reflect a target hazard quotient of 0.1.
[2] Florida Department of Environmental Protection (FDEP) Cleanup Target Levels, Chapter 62-777, Florida Administrative Code (FDEP, 1999).
[3] The selected screening concentration for the human health risk assessment is the lowest value of the RBC and the Florida Cleanup Target Level. For analytes that are selected as a human health chemical of potential concern in groundwater, then the Florida Soil Cleanup Target Level based on leaching is selected as the screening concentration.
[4] RBC value for pyrene is used as a surrogate.
[5] Value for PCBs is used as a surrogate.
[6] General value for chlordane is used.
[7] RBC value is based on arsenic as a carcinogen.
[8] Essential nutrient screening value (see General Information Report).
[9] RBC and Florida Cleanup Target Level values are based on Chromium VI.
[10] RBC value is based on hydrogen cyanide.
[11] RBC is not available for lead; value is from Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12).
[12] RBC value is based on thallium sulfate.

Notes: μg/kg = micrograms per kilogram.
PCB = polychlorinated biphenyl.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyltrichloroethane.
NC = not calculated, per FDEP, 1996
mg/kg = milligrams per kilogram.
NSC = no screening criteria available.

Table G-2
Screening Concentrations for Subsurface Soil for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Risk Based Screening Concentration[1]	Florida Cleanup Target Level[2]	Florida Cleanup Target Level based on Leaching[2]	Selected Screening Concentration[3]
Volatile Organic Compounds (μg/kg)				
Acetone	20,000,000	5,500,000	2,800	5,500,000
2-Butanone	120,000,000	21,000,000	17,000	21,000,000
Carbon Disulfide	20,000,000	1,400,000	5,600	1,400,000
Ethylbenzene	20,000,000	8,400,000	600	8,400,000
Methylene chloride	760,000	23,000	20	23,000
Toluene	41,000,000	2,600,000	500	2,600,000
Xylenes (total)	410,000,000	40,000,000	200	40,000,000
Semivolatile Organic Compounds (μg/kg)				
2-Methylnaphthalene	4,100,000	560,000	6,100	560,000
Acenaphthene	12,000,000	18,000,000	2,100	12,000,000
Benzo(a)pyrene	780	500	8,000	500
Benzo(b)fluoranthene	7,800	4,800	10,000	4,800
Benzo(k)fluoranthene	78,000	52,000	25,000	52,000
Fluoranthene	8,200,000	48,000,000	1,200,000	8,200,000
Fluorene	8,200,000	28,000,000	160,000	8,200,000
Naphthalene	4,100,000	270,000	1,700	270,000
Phenanthrene	[4] 6,100,000	30,000,000	250,000	6,100,000
Pyrene	6,100,000	37,000,000	880,000	6,100,000
bis(2-Ethylhexyl)phthalate	410,000	280,000	3,600,000	280,000
Pesticides (μg/kg)				
4,4'-DDD	24,000	18,000	4,000	18,000
4,4'-DDE	17,000	13,000	18,000	13,000
4,4'-DDT	17,000	13,000	11,000	11,000
Dieldrin	360	300	4	300
Inorganic Analytes (mg/kg)				
Aluminum	200,000	NSC	NC	200,000
Antimony	82	240	5	82
Arsenic	[5] 3.8	3.7	29	3.7
Barium	14,000	87,000	1,600	14,000
Beryllium	410	800	63	410

See notes at end of table.

Table G-2 (Continued)
Screening Concentrations for Subsurface Soil for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Risk Based Screening Concentration[1]	Florida Cleanup Target Level[2]	Florida Cleanup Target Level Based on Leaching[2]	Selected Screening Concentration[3]
Inorganic Analytes (mg/kg) (Continued)				
Cadmium	100	1,300	8	100
Calcium	[6]1,000,000	NSC	NC	1,000,000
Chromium	[7]610	[7]400	38	400
Cobalt	12,000	110,000	NC	12,000
Copper	8,200	76,000	NC	8,200
Cyanide	4,100	28,000	NC	4,100
Iron	61,000	480,000	NC	61,000
Lead	[8]400	920	NC	400
Magnesium	[6]460,468	NSC	NC	460,468
Manganese	4,100	22,000	NC	4,100
Mercury	61	26	2.1	26
Nickel	4,100	28,000	130	4,100
Potassium	[6]1,000,000	NSC	NC	1,000,000
Silver	1,000	9,100	17	1,000
Sodium	[6]1,000,000	NSC	NC	1,000,000
Vanadium	1,400	7,400	980	1,400
Zinc	61,000	560,000	6,000	61,000

[1] For all chemicals except the essential nutrients, the U.S. Environmental Protection Agency Region III Risk Based Concentration (RBC) Table for industrial soil (October 1998) has been used, unless otherwise noted. Screening values are based on a cancer risk of 1×10^{-6} or a hazard quotient of 1.0. Noncarcinogenic RBCs have been adjusted to reflect a target hazard quotient of 0.1.
[2] Florida Department of Environmental Protection (FDEP) Cleanup Target Levels, Chapter 62-777, Florida Administrative Code (FDEP, 1999).
[3] The selected screening concentration for the human health risk assessment is the lowest value of the RBC and the Florida Cleanup Target Level. Only when an analyte was selected as a HHCPC in groundwater, then the Florida Soil Cleanup Target Level based on Leaching.
[4] RBC value for pyrene is used as a surrogate.
[5] RBC value is based on arsenic as a carcinogen.
[6] Essential nutrient screening value (see General Information Report).
[7] RBC and Florida Cleanup Target Level values are based on Chromium VI.
[8] RBC is not available for lead; value is from Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12).

Notes: μg/kg = micrograms per kilogram.
NSC = no screening criteria available.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyltrichloroethane.
mg/kg = milligrams per kilogram.
NC = not calculated, per FDEP, 1996.

Table G-3
Screening Concentrations for Groundwater
For Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Chemical	Risk-Based Screening Concentration[1]	Federal MCL[2]	Florida Groundwater Cleanup Target Level[3]	Selected Screening Concentration[4]
Volatile Organic Compounds (µg/ℓ)				
1,2-Dichloroethane	0.12	5	3	0.21
1,2-Dichloroethene (total)	5.5	[5]70	[5]70	5.5
Benzene	0.36	5	1	0.36
Chloroform	0.15	[6]0.08	[5.7]	0.08
Ethylbenzene	130	700	30	130
Toluene	75	1,000	40	75
Trichloroethene	1.6	5	3	1.6
Xylenes (total)	1,200	10,000	20	1,200
Semivolatile Organic Compounds (µg/ℓ)				
Naphthalene	150	NSC	[20]	20
Phenol	2,200	NSC	[10]	10
bis(2-Ethylhexyl)phthalate	4.8	6	6	4.8
Pesticides and PCBs (µg/ℓ)				
4,4'-DDT	0.2	NSC	[0.1]	0.1
Inorganic Analytes (µg/ℓ)				
Aluminum	3,700	(50-200)	(200)	50
Antimony	1.5	6	6	1.5
Arsenic	[7]0.045	50	50	0.045
Barium	260	2,000	2,000	260
Beryllium	0.016	4	4	0.016
Cadmium	1.8	5	5	1.8
Calcium	[8]1,055,398	NSC	NSC	1,055,398
Chromium	[9]18	100	100	18
Cobalt	220	NSC	420	220
Copper	13,000	[10]1,300 (1,000)	(1,000)	1,000
Cyanide	[11]73	200	200	73
Iron	1,100	(300)	(300)	300
Lead	NSC	[12]15	15	15
Magnesium	[8]118,807	NSC	NSC	118,807
Manganese	84	(50)	(50)	50
Nickel	73	100	100	73
Potassium	[8]297,016	NSC	NSC	297,016

See notes at end of table.

Table G-3 Continued)
Screening Concentrations for Groundwater
For Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Chemical	Risk-Based Screening Concentration[1]	Federal MCL[2]	Florida Groundwater Cleanup Target Level Concentration[3]	Selected Screening Concentration[4]
Inorganic Analytes ($\mu g/\ell$) (Continued)				
Sodium	[8]396,022	NSC	160,000	160,000
Vanadium	26	NSC	[49]	26
Zinc	1,100	(5,000)	(5,000)	1,100

[1] For all chemicals except the essential nutrients, the U.S. Environmental Protection Agency (USEPA) Region III RBC Table for tap water (October 1998) has been used. Screening values are based on a cancer risk of 1×10^{-6} and a hazard quotient of 1. Per USEPA Region IV Guidance (USEPA, 1995), the noncarcinogenic Risk Based Concentration (RBCs) have been adjusted to reflect a target hazard quotient of 0.1.
[2] Federal MCLs are taken from USEPA Drinking Water Regulations and Health Advisories from October 1996. Primary MCLs have no marks, Secondary MCLs are indicated by parentheses ( ), and Federal maximum contaminant level goals (MCLGs) are indicated by brackets [ ]. The lowest of these nonzero values is presented.
[3] Florida Department of Environmental Protection Cleanup Target Levels, Chapter 62-777, Florida Administrative Code (FDEP, 1999). Primary Standards have no marks, Secondary Standards are indicated by parentheses ( ), and other criteria (i.e., carcinogen, organoleptic, or a systemic toxicant) are indicated by brackets [ ].
[4] The selected screening concentration for the human health risk assessment is the lowest value of the RBC, Federal MCL value, and Florida Cleanup Target Level values.
[5] MCL and Florida Cleanup Target Level values are based on the cis-1,2-dichloroethene isomer.
[6] 1994 Proposed rule for Disinfectants and Disinfection By-Products: Total for all THMs combined cannot exceed 0.08 level.
[7] RBC value is based on arsenic as a carcinogen.
[8] Essential nutrient screening value (see GIR Appendix C) (HLA, 1998).
[9] RBC and Florida Cleanup Target Level based on Chromium VI.
[10] Treatment technology action level for copper in drinking water distribution system (USEPA Drinking Water Standards and Health Advisories October 1996).
[11] RBC value is based on hydrogen cyanide.
[12] Treatment technology action level for lead in drinking water (USEPA Drinking Water Standards and Health Advisories, October 1996).

Notes: MCL = maximum contaminant level.
$\mu g/\ell$ = micrograms per liter.
NSC = not presented in available guidance.
PCB = polychlorinated biphenyl.
DDT = dichlorodiphenyltrichloroethane.

Table G-4
Screening Concentrations for Surface Water for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Chemical	Risk-Based Screening Concentration[1]	Region IV Water Quality Standards[2]	Florida Surface Water Cleanup Target Levels[3]	Selected Screening Concentration[4]
Inorganic Analytes ($\mu g/\ell$)				
Aluminum	3,700	NSC	13	13
Barium	260	2,000	NSC	2,000
Beryllium	0.016	NSC	0.13	0.13
Calcium	[5]1,055,398	NSC	NSC	1,055,398
Iron	1,100	300	1,000	300
Lead	[6]15	NSC	NSC	15
Magnesium	[5]118,807	NSC	NSC	118,807
Manganese	84	50	NSC	50
Potassium	[5]297,016	NSC	NSC	297,016
Sodium	[5]396,022	NSC	NSC	396,022
Zinc	1,100	NSC	NSC	1,100

[1] For all chemicals except the essential nutrients, the U.S. Environmental Protection Agency (USEPA) Region III RBC Table for tap water (October 22, 1997) has been used. Screening values are based on a cancer risk of 1×10^{-6} and a hazard quotient of 1. Per USEPA Region IV Guidance (USEPA, 1995), the noncarcinogenic Risk Based Concentrations (RBCs) have been adjusted to reflect a target hazard quotient of 0.1.
[2] Region IV Water Quality Standards for human health criteria (water and organism consumption), January 26, 1996.
[3] Florida Surface Water Cleanup Target Levels (fresh water), Florida Department of Environmental Protection, 1999.
[4] The selected screening concentration for the human health risk assessment is the lesser of the Region IV Water Quality Standard or Florida Surface Water Cleanup Target Levels. If no surface water quality standards are available then the Region III RBC for tap water was used.
[5] Essential nutrient screening value (see GIR HLA, 1998).
[6] Treatment technology action level for lead in drinking water (USEPA Drinking Water Standards and Health Advisories, May 1996).

Notes: $\mu g/\ell$ = micrograms per liter.
NSC = not screening concentration.
RBC = USEPA Region III Risk Based Concentration.

Table G-5
Oral Dose-Response Data for Carcinogenic Effects

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Chemical	Weight of Evidence	Oral Slope Factor (mg/kg/day) (-1)	Source	Test Species	Exposure Route	Tumor Type	Study Source
Volatile Organic Compounds							
1,2-Dichloroethane	B2	9.1e-02	IRIS	Rat	Oral-gavage	Hemangiosarcomas	IRIS
1,2-Dichloroethene (total)	D	ND					
Benzene	A	2.9e-02	IRIS	Human	Occupational	Leukemia	IRIS
Chloroform	B2	6.1e-03	IRIS	Rat	Oral-drinking water	Kidney	IRIS
Trichloroethene	B2	1.1e-02	HEAST				HEAST
Semivolatile Organic Compounds							
Benzo(a)anthracene	B2	7.3	(1)				
Benzo(a)pyrene	B2	7.3	IRIS	Mouse	Oral-diet	Forestomach	IRIS
Benzo(b)fluoranthene	B2	7.3	(1)				
Benzo(k)fluoranthene	B2	7.3	(1)				
Carbazole	B2	2.0e-02	HEAST	Mouse	Oral-diet	Liver	IRIS
Chrysene	B2	7.3	(1)				
Dibenz(a,h)anthracene	B2	7.3	(1)				
Indeno(1,2,3-cd)pyrene	B2	7.3	(1)				
Pesticides and PCBs							
Dieldrin	B2	1.6e+01	IRIS	Mouse	Oral-diet	Liver	IRIS

See notes at end of table

Table G-5 (Continued)
Oral Dose-Response Data
for Carcinogenic Effects

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Chemical	Weight of Evidence	Oral Slope Factor (mg/kg/day) (-1)	Source	Test Species	Exposure Route	Tumor Type	Study Source
Inorganic Analytes							
Aluminum	D	NE					
Antimony	D	NE					
Arsenic	A	1.5e+00	IRIS	Human	Oral-drinking water	Skin	IRIS
Barium	D	NE					
Beryllium							
Cadmium	D	NE					
Iron	D	NE					
Lead	D	NE					
Manganese	D	NE					

(1) Relative potency factors (USEPA, 1993) have been applied to the ingestion slope factor for benzo(a)pyrene for all PAHs classified as A or B carcinogens.
(2) The ingestion slope factor for PCBs.

Notes: Integrated Risk Information System (IRIS) on-line database search, current as of February 1998.
Health Effects Assessment Summary Tables (HEAST), current as of July 1997.

Weight of Evidence (route-specific):
A = Human carcinogen
B = Probable human carcinogen (B1 = limited human evidence; B2 = sufficient human evidence)
C = Possible human carcinogen
D = Not classifiable as to human carcinogenicity

mg/kg-day = milligrams per kilogram per day.
IRIS = Integrated Risk Information System.
HEAST = Health Effects Assessment Summary Tables.
PCB = polychlorinated biphenyl.
NE = not evaluated.

Table G-6
Inhalation Dose-Response Data for Carcinogenic Effects

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Chemical	Weight of Evidence	Inhalation Slope Factor (mg/kg/day)(-1)	Source	Inhalation Unit Risk ($\mu g/m^3$)(-1)	Source	Test Species	Exposure Route	Tumor Type	Study Source
Volatile Organic Compounds									
1,2-Dichloroethane	B2	9.1e-02	IRIS	2.6e-05	IRIS	Rat	Oral-gavage	Hemangiosacrcomas	
1,2-Dichlroethene (total)	D								
Benzene	A	2.9e-02	IRIS	8.3e-06	IRIS	Human	Inhalation	Leukemia	IRIS
Chloroform	B2	8.1e-02	IRIS	2.3E-05	IRIS	Mouse	Oral-gavage	Liver	IRIS
Trichloroethene	D	NE		NE					
Semivolatile Organic Compounds									
Benzo(a)anthracene	B2	3.1	Region 4, Guidance	0.88	Region 4, Guidance				
Benzo(a)pyrene	B2	3.1	Region 4, Guidance	0.88	Region 4, Guidance				
Benzo(b)fluoranthene	B2	3.1	Region 4, Guidance	0.88	Region 4, Guidance				
Benzo(k)fluoranthene	B2	3.1	Region 4, Guidance	0.88	Region 4, Guidance				
Carbazole	B	ND							IRIS
Chrysene	B2	3.1	Region 4, Guidance	0.88	Region 4, Guidance				
Dibenz(a,h)anthracene	B2	3.1	Region 4, Guidance	0.88	Region 4, Guidance				
Indeno(1,2,3-cd)pyrene	B2	3.1	Region 4, Guidance	0.88	Region 4, Guidance				

See notes at end of table

Table G-6 (Continued)
Inhalation Dose-Response Data for Carcinogenic Effects

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Chemical	Weight of Evidence	Inhalation Slope Factor (mg/kg/day)(-1)	Source	Inhalation Unit Risk ($\mu g/m^3$)(-1)	Source	Test Species	Exposure Route	Tumor Type	Study Source
Pesticides and PCBs									
Dieldrin	B2	NE		NE					
Inorganic Analytes									
Aluminum	D	NE		NE					
Antimony	D	NE							
Arsenic	A	15.	IRIS	4.3e-03	IRIS	Human	Inhalation	Lung	IRIS
Barium	ND								
Beryllium	B2	8.4e+00	IRIS	2.4e-03	IRIS	Human	Inhalation	Lung	IRIS
Cadmium	A	4.1e+01	HEAST	1.2e-02	IRIS	Human	Inhalation	Lung	IRIS
Iron	D	NE		NE					
Lead	B2	ND	IRIS	ND	IRIS				
Manganese	D	NE		NE					

Notes: NE = Not Evaluated

Integrated Risk Information System (IRIS) on-line database search, current as of November 1997.
Health Effects Assessment Summary Tables (HEAST), current as of November 1995.

Weight of Evidence (route-specific):
- A = Human carcinogen
- B = Probable human carcinogen (B1 = limited human evidence; B2 = sufficient human evidence)
- C = Possible human carcinogen
- D = Not classifiable as to human carcinogenicity

mg/kg-day = milligrams per kilogram per day.
$(\mu g/m^3)^{-1}$ = micrograms per cubic meter to the minus 1.
IRIS = Integrated Risk Information System.
NE = not evaluated.
PCB = polychlorinated biphenyl.
HEAST = Health Effects Assessment Summary Tables.

Table G-7
Dermal Dose-Response Data for Carcinogenic Effects

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Compound	Weight of Evidence	Oral Slope Factor (mg/kg-day)-1	Oral Absorption Efficiency	Source/ Reference	Dermal Slope Factor (mg/kg-day)-1
Volatile Organic Compounds					
1,2-Dichloroethane	B2	9.1e-02	100%	Reitz et al., 1980	9.1e-02
1,2-dichloroethene	D	NE			
Benzene	A	2.9e-02	(1)		2.9e-02
Chloroform	B2	6.1e-03	100%	Brown et al., 1974	6.1e-03
Trichloroethene	B	1.1e-02	100%	Prout et al., 1985	1.1e-02
Semivolatile Organic Compounds					
Benzo(a)anthracene	B2	7.3e+00	91%	(1)/(2)	8.0e+00
Benzo(a)pyrene	B2	7.3e+00	91%	IRIS / Hecht et al., 1979	8.0e+00
Benzo(b)fluoranthene	B2	7.3e+00	91%	(1)/(2)	8.0e+00
Benzo(k)fluoranthene	B2	7.3e+00	91%	(1)/(2)	8.0e+00
Carbazole	B2	2.0e-02	50 %	USEPA, 1995	4.0e-02
Chrysene	B2	7.3e+00	91%	(1)/(2)	8.0e+00
Dibenz(a,h)anthracene	B2	7.3e+00	91%	(1)/(2)	8.0e+00
Indeno(1,2,3-cd)pyrene	B2	7.3e+00	91%	(1)/(2)	8.0e+00
Pesticides and PCBs					
Dieldrin	B2	1.6e+01	80%	3%	2.0e+01
Inorganic Analytes					
Aluminum	D	NE			NE
Antimony	D	NE			

See notes at end of table

Table G-7 (Continued)
Dermal Dose-Response Data for Carcinogenic Effects

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Compound	Weight of Evidence	Oral Slope Factor (mg/kg-day)-1	Oral Absorption Efficiency	Source/ Reference	Dermal Slope Factor (mg/kg-day)-1
Inorganic Analytes (Continued)					
Arsenic	A	1.5e+00	98%	Vahter, 1983	1.5e+00
Barium	D	NE			NE
Beryllium	B2	4.3e+00	1%	Owen, 1990	4.3e+02
Cadmium	D	NE			
Iron	D	NE			NE
Lead	D	NE			NE
Manganese	D	NE			NE

(1) Toxicity value of benzo(a)pyrene used as a surrogate.
(2) The oral absorption efficiency of all PAHs is assumed to be identical to that of benzo(a)pyrene, based on structural analogy.
(3) The ingestion slope factor for PCBs.

Notes: For documentation concerning oral slope factors, refer to Table 1.

Weight of Evidence (route-specific):
A = Human carcinogen
B = Probable human carcinogen (B1 = limited human evidence; B2 = sufficient human evidence)
C = Possible human carcinogen
D = Not classifiable as to human carcinogenicity.

mg/kg-day = milligrams per kilogram per day.
mg/kg-day = milligrams per kilogram per day.
% = percent.
NE = not evaluated.
IRIS = Integrated Risk Information System.
PCB = polychlorinated biphenyl.

Table G-8
Oral Dose-Response Data for Noncarcinogenic Effects

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Chemical	Chronic		Subchronic		Study Type	Confidence Level	Critical Effect	Test Animal	Uncertainty Factor	Study Source
	Oral RfD (mg/kg-day)	Source	Oral RfD (mg/kg-day)	Source						
Volatile Organic Compounds										
1,2-Dichloroethane	3.0e-01	NCEA	ND							
1,2-Dichloroethene (total)	9.0e-03	HEAST	9.0e-03	HEAST	Oral-drinking water	ND	Liver lesions	Rat	1,000	HEAST
Benzene	3.0e-04	IRIS	ND		Oral-gavage	Low	Increased liver and kidney weights	Rat	1,000 H,A,S	IRIS
Chloroform	1.0e-02	IRIS	1.0e-02		Oral-capsule	Medium	Fatty cyst formation in liver	Dog	1,000 H,A,S	IRIS
Trichloroethene	6.0e-03		ND							NCEA
Semivolatile Organic Compounds										
Benzo(a)anthracene	ND		ND							
Benzo(a)pyrene	ND		ND							
Benzo(b)fluoranthene	ND		ND							
Benzo(k)fluoranthene	ND		ND							
Carbazole	ND		ND							
Chrysene	ND		ND							
Dibenz(a,h)anthracene	ND		ND							
Indeno(1,2,3-cd)pyrene	ND		ND							
Pesticides and PCBs										
Dieldrin	2.0e-05	IRIS	5.0e-05	HEAST	Oral-capsule	Medium	Immunological and clinical effects	Monkey	300 H,A,S,L	IRIS
Inorganic Analytes										
Aluminum	1.0e+00	(1)	ND							
Antimony	4.0e-04	IRIS	4.0e-04	HEAST	Oral-drinking water	Low	Reduced lifespan	Rat	1,000 H,A,L	IRIS

See notes at end of table

Table G-8 (Continued)
Oral Dose-Response Data
for Noncarcinogenic Effects

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Chemical	Chronic		Subchronic		Study Type	Confidence Level	Critical Effect	Test Animal	Uncertainty Factor	Study Source
	Oral RfD (mg/kg-day)	Source	Oral RfD (mg/kg-day)	Source						
Inorganic Analytes (Continued)										
Arsenic	3.0e-04	IRIS	3.0e-04	HEAST	Oral-drinking water	Medium	Hyperpigmentation, keratosis	Human	3 D	IRIS
Barium	7.0e-02	IRIS	7.0e-02	IRIS	Oral-drinking water	Medium	Increased blood pressure	Human	3 H	IRIS
Beryllium	5.0e-03	IRIS	5.0e-03	IRIS	Oral-drinking water	Rat	No effects observed	Rat	100 H, A	IRIS
Cadmium	1.0e-03	IRIS	ND		Oral-diet	Human	Proteinuria	Human	10 H	IRIS
Iron	3.0e-01	(1)	ND							
Lead	ND		ND							
Manganese	4.7e-02	IRIS	ND		Oral-diet	Medium	No effects observed	Human	1,1 M	IRIS

[1] This value was provided by the Environmental Criteria and Assessment Office (ECAO) of the USEPA in response to a specific request.
[2] Value for pyrene was used as surrogate for total petroleum hydrocarbons.

Notes: IRIS on-line database search, current as of November 1997.
HEAST, current as of November 1995.
Environmental Criteria and Assessment Office (ECAO) of the USEPA in response to a specific request.

Uncertainty factors:
H = Variation in human sensitivity
A = Animal to human extrapolation
S = Extrapolation from subchronic to chronic NOAEL
L = Extrapolation from LOAEL to NOAEL
D = Inadequate data
M = Modifying factor

RfD = reference dose.
mg/kg-day = milligrams per kilogram per day.
NCEA = ?.
ND = no data.
HEAST = Health Effects Assessment Summary Tables.
IRIS = Integrated Risk Information System.
PCB = polychlorinated biphenyl.

Table G-9
Inhalation Dose-Response Data for Noncarcinogenic Effects

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Chemical	Chronic		Subchronic		Study Type	Confidence Level	Critical Effect	Test Animal	Uncertainty Factor	Study Source
	RfC ($\mu g/m^3$)	Source	RfC ($\mu g/m^3$)	Source						
Volatile Organic Compounds										
1,2-Dichloroethane	ND		ND							
1,2-Dichloroethene (total)	ND		ND							
Benzene	ND		ND							
Chloroform	ND		ND							
Trichloroethene	ND		ND							
Semivolatile Organic Compounds										
Benzo(a)anthracene	ND		ND							
Benzo(a)pyrene	ND		ND							
Benzo(b)fluoranthene	ND		ND							
Benzo(k)fluoranthene	ND		ND							
Carbazole	ND		ND							
Chrysene	ND		ND							
Dibenz(a,h)anthracene	ND		ND							
Indeno(1,2,3-cd)pyrene	ND		ND							
Pesticides and PCBs										
Dieldrin	ND		ND							

See notes at end of table

Table G-9 (Continued)
Inhalation Dose-Response Data for Noncarcinogenic Effects

Remedial Investigation Report
Site 16, Open Disposal and Burning Area
Naval Air Station Whiting Field
Milton, Florida

Chemical	Chronic		Subchronic		Study Type	Confidence Level	Critical Effect	Test Animal	Uncertainty Factor	Study Source
	RfC ($\mu g/m^3$)	Source	RfC ($\mu g/m^3$)	Source						
Inorganic Analytes										
Aluminum	ND		ND							
Antimony	ND		ND							
Arsenic	ND		ND							
Barium	ND		ND							
Beryllium	ND		ND							
Cadmium	ND		ND							
Iron	ND		ND							
Lead	ND		ND							
Manganese	ND		ND							

Notes: Integrated Risk Information System (IRIS) on-line database search, current as of November 1997.
Health Effects Assessment Summary Tables (HEAST), current as November 1995.

Uncertainty factors:
A = Animal to human extrapolation
H = Variation in human sensitivity
S = Extrapolation from subchronic to chronic NOAEL
L = Extrapolation from LOAEL to NOAEL
D = Inadequate data
M = Modifying factor

RfC = reference concentration.
$\mu g/m^3$ = micrograms per cubic meter.
ND = no data.
PCB = polychlorinated biphenyl.

Table G-10
Dermal Dose-Response Data for Noncarcinogenic Effects

Remedial Investigation Report
Site 16
NAS, Whiting Field, Milton, Florida

Compound	Chronic Oral RfD (mg/kg-day)	Subchronic Oral RfD (mg/kg-day)	Oral Absorption Efficiency	Reference	Dermal Chronic RfD (mg/kg-day)	Dermal Subchronic RfD (mg/kg-day)
Volatile Organic Compounds						
1,2-Dichloroethane	3.0e-01	ND	100%	Reitz et al., 1980	3.0e-01	ND
1,2-Dichloroethene	9.0e-03	9.0e-03	100%	Putcha et al., 1986	9.0e-03	9.0e-03
Benzene	3.0e-04	ND	100%	ATSDR, 1993	3.0e-04	ND
Chloroform	1.0e-02	1.0e-02	100%	Brown et al., 1974	1.0e-02	1.0e-02
Trichloroethene	6.0e-03	ND	100%	Prout et al., 1985	6.0e-03	ND
Semivolatile Organic Compounds						
Benzo(a)anthracene	ND	ND	91%	(1)	ND	ND
Benzo(a)pyrene	ND	ND	91%	Hecht et al., 1979	ND	ND
Benzo(b)fluoranthene	ND	ND	91%	(1)	ND	ND
Benzo(k)fluoranthene	ND	ND	91%	(1)	ND	ND
Carbazole	ND	ND			ND	ND
Chrysene	ND	ND	91%	(1)	ND	ND
Dibenz(a,h)anthracene	ND	ND	91%	(1)	ND	ND
Indeno(1,2,3-cd)pyrene	ND	ND	91%	(1)	ND	ND
Pesticides and PCBs						
Dieldrin	5.0e-05	5.0e-05	50%		2.5e-05	2.5e-05
Inorganic Analytes						
Aluminum	1.0e+00	ND	20%	(2)	2.0e-01	ND
Antimony	4.0e-04	4.0e-04	10%	ATSDR, 1991a	4.0e-05	4.0e-05
Arsenic	3.0e-04	3.0e-04	98%	Vahter, 1983	2.9e-04	2.9e-04

See notes at end of table

Table G-10 (Continued)
Dermal Dose-Response Data for Noncarcinogenic Effects

Remedial Investigation Report
Site 16
NAS, Whiting Field, Milton, Florida

Compound	Chronic Oral RfD (mg/kg-day)	Subchronic Oral RfD (mg/kg-day)	Oral Absorption Efficiency	Reference	Dermal Chronic RfD (mg/kg-day)	Dermal Subchronic RfD (mg/kg-day)
Inorganic Analytes (Continued)						
Barium	7.0e-02	7.0e-02	7%	ATSDR, 1991b	4.9e-03	4.9e-03
Beryllium	5.0e-03	5.0e-03	1%	Owen, 1990	5.0e-05	5.0e-05
Cadmium	5.0e-03	2.0e-02	11%	Ogawa, 1976	5.5e-04	2.2e-03
Iron	3.0e-01	ND	2%	Goyer, 1991	6.0e-03	ND
Lead	ND	ND				
Manganese	4.7e-02	ND	4%	ATSDR, 1991c	1.9e-03	ND

(1) The oral absorption efficiency of all polynuclear aromatic hydrocarbons is assumed to be identical to that of benzo(a)pyrene, based on structural analogy.
(2) Inorganics lacking specific information on absorption efficiency are assigned a default value of 20% (U.S. Environmental Protection Agency Region IV, 1993).

Agency for Toxic Substances and Disease Registry (ATSDR), 1991a. "Toxicological Profile for Antimony". Agency for Toxic Substances and Disease Registry, U.S. Public Health Service (Draft).
ATSDR, 1991b. "Toxicological Profile for Manganese". Agency for Toxic Substances and Disease Registry, U.S. Public Health Service (Draft).
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Ogata, M. and Y. Shimada. 1987. Differences in Urinary Monochlorobenzene Metabolities Between Rats and Humans. Int. Arch. Occup. Environ. Health 53: 51-57.
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Prout, M.S., W.M. Provan, and T. Green. 1985. Species Differences in Response to Trichloroethylene. Toxicol. Appl. Pharmacol. 79: 389-400.
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Vahter, M. 1983. Metabolism of Arsenic. In: Fowler, B.A., ed. Biological and Environmental Effect of Arsenic. NY: Elsevier. pp. 171-198.

Notes: For documentation concerning chronic and subchronic oral RfDs, refer to Table 3.

RfD = reference dose.
mg/kg-day = milligrams per kilogram per day.
ND = no data.
% = percent.
PCB = polychlorinated biphenyl.

TABLE G-11

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
ABSORPTION FRACTION	ABS_d	chemical specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm^2-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-06	kg/mg	inorganics
	CF	1.00E-09	kg/ug	organics
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	45	days/year [1]	Assumption
EXPOSURE DURATION	ED	20	years	Assumption
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	20	years	Assumption

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = \frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$DAevent = AF \times ABS_d \times CF$

Note: For noncarcinogenic effects: AT = ED

TABLE G-11

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene [1]	O	35	ug/kg	1.8E-09	7.3E+00	1.3E-08	0.01	1.0E-09	8.0E+00	8.1E-09	2.1E-08
Benzo(a)pyrene	O	370	ug/kg	1.9E-08	7.3E+00	1.4E-07	0.01	1.1E-08	8.0E+00	8.6E-08	2.2E-07
Benzo(b)fluoranthene [1]	O	41	ug/kg	2.1E-09	7.3E+00	1.5E-08	0.01	1.2E-09	8.0E+00	9.5E-09	2.5E-08
Benzo(k)fluoranthene [1]	O	3.9	ug/kg	2.0E-10	7.3E+00	1.4E-09	0.01	1.1E-10	8.0E+00	9.0E-10	2.3E-09
Carbazole	O	97	ug/kg	4.9E-09	2.0E-02	9.8E-11	0.01	2.8E-09	4.0E-02	1.1E-10	2.1E-10
Chrysene [1]	O	0.39	ug/kg	2.0E-11	7.3E+00	1.4E-10	0.01	1.1E-11	8.0E+00	9.0E-11	2.3E-10
Dibenz(a,h)anthracene [1]	O	240	ug/kg	1.2E-08	7.3E+00	8.8E-08	0.01	6.9E-09	2.0E+01	1.4E-07	2.3E-07
Indeno(1,2,3-cd)pyrene [1]	O	32	ug/kg	1.6E-09	7.3E+00	1.2E-08	0.01	9.3E-10	8.0E+00	7.4E-09	1.9E-08
Dieldrin	O	32	ug/kg	1.6E-09	1.6E+01	2.6E-08	0.01	9.3E-10	3.2E+01	3.0E-08	5.5E-08
Arsenic	I	3.8	mg/kg	1.9E-07	1.5E+00	2.9E-07	0.001	1.1E-08	1.5E+00	1.6E-08	3.0E-07
Lead	I	473	mg/kg	2.4E-05	ND		0.001	1.4E-06	ND		
SUMMARY CANCER RISK						6E-07				3E-07	9E-07

[1] Cacinogenic PAH concentrations are adjusted by their respective toxicity equivalent factors (USEPA, 1995).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

TABLE 6-12

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.833	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	4	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	20	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	20	years	USEPA, 1991

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogenic effects, AT = ED

TABLE G-12

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK
Benzo(a)anthracene	O	35	ug/kg	2.82E-11	4.7E-14	3.1E+00	1.5E-13
Benzo(a)pyrene	O	370	ug/kg	2.98E-10	5.0E-13	3.1E+00	1.6E-12
Benzo(b)fluoranthene	O	41	ug/kg	3.31E-11	5.5E-14	3.1E+00	1.7E-13
Benzo(k)fluoranthene	O	3.9	ug/kg	3.15E-12	5.3E-15	3.1E+00	1.6E-14
Chrysene	O	0.39	ug/kg	3.15E-13	5.3E-16	3.1E+00	1.6E-15
Dibenz(a,h)anthracene	O	240	ug/kg	1.94E-10	3.2E-13	3.1E+00	1.0E-12
Indeno(1,2,3-cd)pyrene	O	32	ug/kg	2.58E-11	4.3E-14	3.1E+00	1.3E-13
Dieldrin	I	32	mg/kg	2.58E-08	4.3E-11	1.6E+01	6.9E-10
Arsenic	I	3.8	mg/kg	3.06E-09	5.1E-12	1.5E+01	7.7E-11
Lead	I	473	mg/kg	3.81E-07	6.4E-10	ND	
						SUMMARY CANCER RISK	8E-10

[1] Toxicity equivalent factors are applied to carcinogenic PAHs per USEPA Region IV Guidance (USEPA, 1995).

TABLE G-12

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	2.82E-10	1.7E-12	ND	
Benzo(a)pyrene	O	370	ug/kg	2.98E-10	1.8E-12	ND	
Benzo(b)fluoranthene	O	410	ug/kg	3.31E-10	1.9E-12	ND	
Benzo(k)fluoranthene	O	390	ug/kg	3.15E-10	1.8E-12	ND	
Carbazole	O	97	ug/kg	7.82E-11	4.6E-13	ND	
Chyrsene	O	390	ug/kg	3.15E-10	1.8E-12	ND	
Dibenz(a,h)anthracene	O	390	ug/kg	3.15E-10	1.8E-12	ND	
Indeno(1,2,3-cd)pyrene	O	240	ug/kg	1.94E-10	1.1E-12	ND	
Dieldrin	I	320	mg/kg	2.58E-07	1.5E-09	ND	
Aluminum	I	11300	mg/kg	9.11E-06	5.3E-08	ND	
Arsenic	I	3.8	mg/kg	3.06E-09	1.8E-11	ND	
Cadmium	I	2.1	mg/kg	1.69E-09	9.9E-12	ND	
Iron	I	13900	mg/kg	1.12E-05	6.6E-08	ND	
Lead	I	473	mg/kg	3.81E-07	2.2E-09	ND	
Manganese	I	296	mg/kg	2.39E-07	1.4E-09	1.4E-05	1.0E-04
				SUMMARY HAZARD INDEX			0.0001

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TABLE 6-13

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
AGE-SPECIFIC SURFACE AREA	SA_i	age-specific	cm^2	USEPA, 1989
ABSORPTION FRACTION	ABS_d	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganics
	CF	1.00E-09	kg/mg	Organics
BODY WEIGHT	BW	45	kg	USEPA, 1995
AGE-SPECIFIC BODY WEIGHT	BW_i	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	45	days/year [1]	Assumption
EXPOSURE DURATION	ED	10	years	USEPA, 1995
AGE-SPECIFIC EXPOSURE DURATION	ED_i	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	$SA_{soil/adj}$	1013	cm^2-year/kg	Per USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	Per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	10	years	USEPA, 1995

[1] Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.
[2] In estimating the dermally absorbed dose for children age 7 through 16, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 10 age periods, age 7 through 16, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = AT \times 365\ days/year) \times SA_{soil/adj}$$

Where:

$$SA_{soil/adj} = SUM\ (SA_i \times ED_i\ /\ BW_i)$$

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Note: For noncarcinogenic effects: AT = ED.

TABLE G-13

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene [1]	O	35	ug/kg	1.4E-09	7.3E+00	1.0E-08	0.01	6.2E-10	8.0E+00	5.0E-09	1.5E-08
Benzo(a)pyrene	O	370	ug/kg	1.4E-08	7.3E+00	1.1E-07	0.01	6.6E-09	8.0E+00	5.3E-08	1.6E-07
Benzo(b)fluoranthene [1]	O	41	ug/kg	1.6E-09	7.3E+00	1.2E-08	0.01	7.3E-10	8.0E+00	5.9E-09	1.8E-08
Benzo(k)fluoranthene [1]	O	3.9	ug/kg	1.5E-10	7.3E+00	1.1E-09	0.01	7.0E-11	8.0E+00	5.6E-10	1.7E-09
Carbazole	O	97	ug/kg	3.8E-09	2.0E-02	7.6E-11	0.01	1.7E-09	4.0E-02	6.9E-11	1.5E-10
Chrysene [1]	O	0.39	ug/kg	1.5E-11	7.3E+00	1.1E-10	0.01	7.0E-12	8.0E+00	5.6E-11	1.7E-10
Dibenz(a,h)anthracene [1]	O	240	ug/kg	9.4E-09	7.3E+00	6.9E-08	0.01	4.3E-09	8.0E+00	3.4E-08	1.0E-07
Indeno(1,2,3-cd)pyrene [1]	O	32	ug/kg	1.3E-09	7.3E+00	9.1E-09	0.01	5.7E-10	8.0E+00	4.6E-09	1.4E-08
Dieldrin	O	32	ug/kg	1.3E-09	1.6E+01	2.0E-08	0.01	5.7E-10	3.2E+01	1.8E-08	3.8E-08
Arsenic	I	3.8	mg/kg	1.5E-07	1.5E+00	2.2E-07	0.001	6.8E-09	1.5E+00	1.0E-08	2.3E-07
Lead	I	473	mg/kg	1.9E-05	ND		0.001	8.4E-07	ND		
				SUMMARY CANCER RISK		4E-07				1E-07	6E-07

[1] Cacinogenic PAH concentrations are adjusted by their respective toxicity equivalent factors (USEPA, 1995).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

TABLE 6-13

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	9.6E-08	ND		0.01	4.4E-08	ND		
Benzo(a)pyrene	O	370	ug/kg	1.0E-07	ND		0.01	4.6E-08	ND		
Benzo(b)fluoranthene	O	410	ug/kg	1.1E-07	ND		0.01	5.1E-08	ND		
Benzo(k)fluoranthene	O	390	ug/kg	1.1E-07	ND		0.01	4.9E-08	ND		
Carbazole	O	200	ug/kg	5.5E-08	ND		0.01	2.5E-08	ND		
Chrysene	O	390	ug/kg	1.1E-07	ND		0.01	4.9E-08	ND		
Dibenz(a,h)anthracene	O	240	ug/kg	6.6E-08	ND		0.01	3.0E-08	ND		
Indeno(1,2,3-cd)pyrene	O	320	ug/kg	8.8E-08	ND		0.01	4.0E-08	ND		
Dieldrin	O	32	ug/kg	8.8E-09	5.0E-05	1.8E-04	0.01	4.0E-09	2.5E-05	1.6E-04	3.4E-04
Aluminum	I	11300	mg/kg	3.1E-03	1.0E+00	3.1E-03	0.001	1.4E-04	2.0E-01	7.1E-04	3.8E-03
Arsenic	I	3.8	mg/kg	1.0E-06	3.0E-04	3.5E-03	0.001	4.7E-08	2.9E-04	1.6E-04	3.6E-03
Cadmium	I	2.1	mg/kg	5.8E-07	1.0E-03	5.8E-04	0.001	2.6E-08	1.0E-05	2.6E-03	3.2E-03
Iron	I	13900	mg/kg	3.8E-03	3.0E-01	1.3E-02	0.001	1.7E-04	6.0E-03	2.9E-02	4.2E-02
Lead	I	473	mg/kg	1.3E-04	ND		0.001	5.9E-06	ND		
Manganese	I	296	mg/kg	8.1E-05	4.7E-02	1.7E-03	0.001	3.7E-06	1.9E-03	1.9E-03	3.7E-03
SUMMARY HAZARD INDEX						0.02				0.03	0.06

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE 6-14

INHALATION OF PARTICULATES - SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.625	m^3/hour	USEPA, 1995
BODY WEIGHT	BW	45	kg	USEPA, 1995
EXPOSURE TIME	ET	4	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	10	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	10	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA 1995. Supplemental Guidance to RAGS, Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogenic effects: AT = ED

TABLE 6-14

INHALATION OF PARTICULATES - SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Benzo(a)anthracene	O	35	ug/kg	2.82E-11	2.8E-14	3.1E+00	8.6E-14
Benzo(a)pyrene	O	370	ug/kg	2.98E-10	2.9E-13	3.1E+00	9.1E-13
Benzo(b)fluoranthene	O	41	ug/kg	3.31E-11	3.2E-14	3.1E+00	1.0E-13
Benzo(k)fluoranthene	O	3.9	ug/kg	3.15E-12	3.1E-15	3.1E+00	9.5E-15
Chrysene	O	0.39	ug/kg	3.15E-13	3.1E-16	3.1E+00	9.5E-16
Dibenz(a,h)anthracene	O	240	ug/kg	1.94E-10	1.9E-13	3.1E+00	5.9E-13
Indeno(1,2,3-cd)pyrene	O	32	ug/kg	2.58E-11	2.5E-14	3.1E+00	7.8E-14
Dieldrin	I	32	mg/kg	2.58E-08	2.5E-11	1.6E+01	4.0E-10
Arsenic	I	3.8	mg/kg	3.06E-09	3.0E-12	1.5E+01	4.5E-11
Lead	I	473	mg/kg	3.81E-07	3.7E-10	ND	
					SUMMARY CANCER RISK		5E-10

[1] Toxicity equivalent factors are applied to carcinogenic PAHs per USEPA Region IV Guidance (USEPA, 1995).

TABLE 6-14

INHALATION OF PARTICULATES - SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	2.82E-10	1.9E-12	ND	
Benzo(a)pyrene	O	370	ug/kg	2.98E-10	2.0E-12	ND	
Benzo(b)fluoranthene	O	410	ug/kg	3.31E-10	2.3E-12	ND	
Benzo(k)fluoranthene	O	390	ug/kg	3.15E-10	2.2E-12	ND	
Carbazole	O	97	ug/kg	7.82E-11	5.4E-13	ND	
Chyrsene	O	390	ug/kg	3.15E-10	2.2E-12	ND	
Dibenz(a,h)anthracene	O	390	ug/kg	3.15E-10	2.2E-12	ND	
Indeno(1,2,3-cd)pyrene	O	240	ug/kg	1.94E-10	1.3E-12	ND	
Dieldrin	I	320	mg/kg	2.58E-07	1.8E-09	ND	
Aluminum	I	11300	mg/kg	9.11E-06	6.2E-08	ND	
Arsenic	I	3.8	mg/kg	3.06E-09	2.1E-11	ND	
Cadmium	I	2.1	mg/kg	1.69E-09	1.2E-11	ND	
Iron	I	13900	mg/kg	1.12E-05	7.7E-08	ND	
Lead	I	473	mg/kg	3.81E-07	2.6E-09	ND	
Manganese	I	296	mg/kg	2.39E-07	1.6E-09	1.4E-05	1.2E-04
SUMMARY HAZARD INDEX							0.0001

TABLE G-15

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
ABSORPTION FRACTION	ABS_d	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	350	days/year [1]	Assumption
EXPOSURE DURATION	ED	24	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1995

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Note: For noncarcinogenic effects, AT = ED.

TABLE 6-15

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene [1]	O	35	ug/kg	1.6E-08	7.3E+00	1.2E-07	0.01	9.5E-09	8.0E+00	7.6E-08	2.0E-07
Benzo(a)pyrene	O	370	ug/kg	1.7E-07	7.3E+00	1.3E-06	0.01	1.0E-07	8.0E+00	8.0E-07	2.1E-06
Benzo(b)fluoranthene [1]	O	41	ug/kg	1.9E-08	7.3E+00	1.4E-07	0.01	1.1E-08	8.0E+00	8.9E-08	2.3E-07
Benzo(k)fluoranthene [1]	O	3.9	ug/kg	1.8E-09	7.3E+00	1.3E-08	0.01	1.1E-09	8.0E+00	8.4E-09	2.2E-08
Carbazole	O	97	ug/kg	4.6E-08	2.0E-02	9.1E-10	0.01	2.6E-08	4.0E-02	1.0E-09	2.0E-09
Chrysene [1]	O	0.39	ug/kg	1.8E-10	7.3E+00	1.3E-09	0.01	1.1E-10	8.0E+00	8.4E-10	2.2E-09
Dibenz(a,h)anthracene [1]	O	240	ug/kg	1.1E-07	7.3E+00	8.2E-07	0.01	6.5E-08	8.0E+00	5.2E-07	1.3E-06
Indeno(1,2,3-cd)pyrene [1]	O	32	ug/kg	1.5E-08	7.3E+00	1.1E-07	0.01	8.6E-09	8.0E+00	6.9E-08	1.8E-07
Dieldrin	O	32	ug/kg	1.5E-08	1.6E+01	2.4E-07	0.01	8.6E-09	3.2E+01	2.8E-07	5.2E-07
Arsenic	I	3.8	mg/kg	1.8E-06	1.5E+00	2.7E-06	0.001	1.0E-07	1.5E+00	1.5E-07	2.8E-06
Lead	I	473	mg/kg	2.2E-04	ND		0.001	1.3E-05	ND		
SUMMARY CANCER RISK						**5E-06**				**2E-06**	**7E-06**

[1] Cacinogenic PAH concentrations are adjusted by their respective toxicity equivalent factors (USEPA, 1995).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

TABLE G-15

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	4.8E-07	ND		0.01	2.8E-07	ND		
Benzo(a)pyrene	O	370	ug/kg	5.1E-07	ND		0.01	2.9E-07	ND		
Benzo(b)fluoranthene	O	410	ug/kg	5.6E-07	ND		0.01	3.2E-07	ND		
Benzo(k)fluoranthene	O	390	ug/kg	5.3E-07	ND		0.01	3.1E-07	ND		
Carbazole	O	200	ug/kg	2.7E-07	ND		0.01	1.6E-07	ND		
Chrysene	O	390	ug/kg	5.3E-07	ND		0.01	3.1E-07	ND		
Dibenz(a,h)anthracene	O	240	ug/kg	3.3E-07	ND		0.01	1.9E-07	ND		
Indeno(1,2,3-cd)pyrene	O	320	ug/kg	4.4E-07	ND		0.01	2.5E-07	ND		
Dieldrin	O	32	ug/kg	4.4E-08	5.0E-05	8.8E-04	0.01	2.5E-08	2.5E-05	1.0E-03	1.9E-03
Aluminum	I	11300	mg/kg	1.5E-02	1.0E+00	1.5E-02	0.001	8.9E-04	2.0E-01	4.5E-03	2.0E-02
Arsenic	I	3.8	mg/kg	5.2E-06	3.0E-04	1.7E-02	0.001	3.0E-07	2.9E-04	1.0E-03	1.8E-02
Cadmium	I	2.1	mg/kg	2.9E-06	1.0E-03	2.9E-03	0.001	1.7E-07	1.0E-05	1.7E-02	1.9E-02
Iron	I	13900	mg/kg	1.9E-02	3.0E-01	6.3E-02	0.001	1.1E-03	6.0E-03	1.8E-01	2.5E-01
Lead	I	473	mg/kg	6.5E-04	ND		0.001	3.7E-05	ND		
Manganese	I	296	mg/kg	4.1E-04	4.7E-02	8.6E-03	0.001	2.3E-05	1.9E-03	1.2E-02	2.1E-02
SUMMARY HAZARD INDEX						**0.001**				**0.001**	**0.002**

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November, 1995).
[2] Calculated from oral RfDs.

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TABLE 6-16

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.833	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	16	hours/day	Assumption
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	24	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$$CA = C \times CF \times (1/PEF)$$

Note:
For noncarcinogenic effects: AT = ED

TABLE Q-16

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)-1	CANCER RISK
Benzo(a)anthracene	O	35	ug/kg	2.82E-11	1.8E-12	3.1E+00	**5.5E-12**
Benzo(a)pyrene	O	370	ug/kg	2.98E-10	1.9E-11	3.1E+00	**5.8E-11**
Benzo(b)fluoranthene	O	41	ug/kg	3.31E-11	2.1E-12	3.1E+00	**6.4E-12**
Benzo(k)fluoranthene	O	3.9	ug/kg	3.15E-12	2.0E-13	3.1E+00	**6.1E-13**
Chrysene	O	0.39	ug/kg	3.15E-13	2.0E-14	3.1E+00	**6.1E-14**
Dibenz(a,h)anthracene	O	240	ug/kg	1.94E-10	1.2E-11	3.1E+00	**3.8E-11**
Indeno(1,2,3-cd)pyrene	O	32	ug/kg	2.58E-11	1.6E-12	3.1E+00	**5.0E-12**
Dieldrin	O	32	ug/kg	2.58E-11	1.6E-12	1.6E+01	**2.6E-11**
Arsenic	I	3.8	mg/kg	3.06E-09	1.9E-10	1.5E+01	**2.9E-09**
Lead	I	473	mg/kg	3.81E-07	2.4E-08	ND	
				SUMMARY CANCER RISK			3E-09

[1] Toxicity equivalent factors are applied to carcinogenic PAHs per USEPA Region IV Guidance (USEPA, 1995).

TABLE 6-16

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	2.82E-10	5.2E-11	ND	
Benzo(a)pyrene	O	370	ug/kg	2.98E-10	5.4E-11	ND	
Benzo(b)fluoranthene	O	410	ug/kg	3.31E-10	6.0E-11	ND	
Benzo(k)fluoranthene	O	390	ug/kg	3.15E-10	5.7E-11	ND	
Carbazole	O	200	ug/kg	1.61E-10	2.9E-11	ND	
Chyrsene	O	390	ug/kg	3.15E-10	5.7E-11	ND	
Dibenz(a,h)anthracene	O	240	ug/kg	1.94E-10	3.5E-11	ND	
Indeno(1,2,3-cd)pyrene	O	320	ug/kg	2.58E-10	4.7E-11	ND	
Dieldrin	O	32	ug/kg	2.58E-11	4.7E-12	ND	
Aluminum	I	11300	mg/kg	9.11E-06	1.7E-06	ND	
Arsenic	I	3.8	mg/kg	3.06E-09	5.6E-10	ND	
Cadmium	I	2.1	mg/kg	1.69E-09	3.1E-10	ND	
Iron	I	13900	mg/kg	1.12E-05	2.0E-06	ND	
Lead	I	473	mg/kg	3.81E-07	7.0E-08	ND	
Manganese	I	296	mg/kg	2.39E-07	4.4E-08	1.4E-05	3.1E-03
				SUMMARY HAZARD INDEX			0.003

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TABLE 6-17

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	200	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm^2	USEPA, 1989
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
BODY WEIGHT	BW	15	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year [1]	USEPA, 1995
EXPOSURE DURATION	ED	6	years	USEPA, 1995
AGE-SPECIFIC EXPOSURE DURATION	ED	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	$SA_{soil/adj}$	766	cm^2-year/kg	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1995

[1] Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.
[2] In estimating the dermally absorbed dose for children age 1 through 6, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 6 age periods, age 1 through 6, per USEPA, 1992.
USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1995. *Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.*

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = (DA_{event} \times EF / AT \times 365\ days/year) \times SA_{soil/adj}$$

Where:

$$SA_{soil/adj} = SUM\ (SA \times ED / BW)$$

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: For noncarcinogenic effects, AT = ED.

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TABLE G17

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene [1]	O	35	ug/kg	3.8E-08	7.3E+00	2.8E-07	0.01	3.7E-09	8.0E+00	2.9E-08	3.1E-07
Benzo(a)pyrene	O	370	ug/kg	4.1E-07	7.3E+00	3.0E-06	0.01	3.9E-08	8.0E+00	3.1E-07	3.3E-06
Benzo(b)fluoranthene [1]	O	41	ug/kg	4.5E-08	7.3E+00	3.3E-07	0.01	4.3E-09	8.0E+00	3.4E-08	3.6E-07
Benzo(k)fluoranthene [1]	O	3.9	ug/kg	4.3E-09	7.3E+00	3.1E-08	0.01	4.1E-10	8.0E+00	3.3E-09	3.4E-08
Carbazole	O	97	ug/kg	1.1E-07	2.0E-02	2.1E-09	0.01	1.0E-08	4.0E-02	4.1E-10	2.5E-09
Chrysene [1]	O	0.39	ug/kg	4.3E-10	7.3E+00	3.1E-09	0.01	4.1E-11	8.0E+00	3.3E-10	3.4E-09
Dibenz(a,h)anthracene [1]	O	240	ug/kg	2.6E-07	7.3E+00	1.9E-06	0.01	2.5E-08	8.0E+00	2.0E-07	2.1E-06
Indeno(1,2,3-cd)pyrene [1]	O	32	ug/kg	3.5E-08	7.3E+00	2.6E-07	0.01	3.4E-09	8.0E+00	2.7E-08	2.8E-07
Dieldrin	O	32	ug/kg	3.5E-08	1.6E+01	5.6E-07	0.01	3.4E-09	3.2E+01	1.1E-07	6.7E-07
Arsenic	I	3.8	mg/kg	4.2E-06	1.5E+00	6.2E-06	0.001	4.0E-08	1.5E+00	6.0E-08	6.3E-06
Lead	I	473	mg/kg	5.2E-04	ND		0.001	5.0E-06	ND		
				SUMMARY CANCER RISK		1E-05				8E-07	1E-05

[1] Cacinogenic PAH concentrations are adjusted by their respective toxicity equivalent factors (USEPA, 1995).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995)
[3] Calculated from oral CSFs.

TABLE 6-17

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	4.5E-06	ND		0.01	4.3E-07	ND		
Benzo(a)pyrene	O	370	ug/kg	4.7E-06	ND		0.01	4.5E-07	ND		
Benzo(b)fluoranthene	O	410	ug/kg	5.2E-06	ND		0.01	5.0E-07	ND		
Benzo(k)fluoranthene	O	390	ug/kg	5.0E-06	ND		0.01	4.8E-07	ND		
Carbazole	O	200	ug/kg	2.6E-06	ND		0.01	2.4E-07	ND		
Chrysene	O	390	ug/kg	5.0E-06	ND		0.01	4.8E-07	ND		
Dibenz(a,h)anthracene	O	240	ug/kg	3.1E-06	ND		0.01	2.9E-07	ND		
Indeno(1,2,3-cd)pyrene	O	320	ug/kg	4.1E-06	ND		0.01	3.9E-07	ND		
Dieldrin	O	32	ug/kg	4.1E-07	5.0E-05	8.2E-03	0.01	3.9E-08	2.5E-05	1.6E-03	9.7E-03
Aluminum	I	11300	mg/kg	1.4E-01	1.0E+00	1.4E-01	0.001	1.4E-03	2.0E-01	6.9E-03	1.5E-01
Arsenic	I	3.8	mg/kg	4.9E-05	3.0E-04	1.6E-01	0.001	4.7E-07	2.9E-04	1.6E-03	1.6E-01
Cadmium	I	2.1	mg/kg	2.7E-05	1.0E-03	2.7E-02	0.001	2.6E-07	1.0E-05	2.6E-02	5.3E-02
Iron	I	13900	mg/kg	1.8E-01	3.0E-01	5.9E-01	0.001	1.7E-03	6.0E-03	2.8E-01	8.8E-01
Lead	I	473	mg/kg	6.0E-03	ND		0.001	5.8E-05	ND		
Manganese	I	296	mg/kg	3.8E-03	4.7E-02	8.1E-02	0.001	3.6E-05	1.9E-03	1.9E-02	1.0E-01
				SUMMARY HAZARD INDEX		1				0.3	1

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE G-18

INHALATION OF PARTICULATES - SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION IN AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.625	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	15	kg	USEPA, 1991
EXPOSURE TIME	ET	24	hours/day	Assumption
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	6	years	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1991

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$INTAKE = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$$CA = C \times CF \times (1/PEF)$$

Note:
For noncarcinogenic effects: AT = ED

TABLE 6-18

INHALATION OF PARTICULATES - SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)-1	CANCER RISK
Benzo(a)anthracene	O	35	ug/kg	2.82E-11	2.3E-12	3.1E+00	7.2E-12
Benzo(a)pyrene	O	370	ug/kg	2.98E-10	2.5E-11	3.1E+00	7.6E-11
Benzo(b)fluoranthene	O	41	ug/kg	3.31E-11	2.7E-12	3.1E+00	8.4E-12
Benzo(k)fluoranthene	O	3.9	ug/kg	3.15E-12	2.6E-13	3.1E+00	8.0E-13
Chrysene	O	0.39	ug/kg	3.15E-13	2.6E-14	3.1E+00	8.0E-14
Dibenz(a,h)anthracene	O	240	ug/kg	1.94E-10	1.6E-11	3.1E+00	4.9E-11
Indeno(1,2,3-cd)pyrene	O	32	ug/kg	2.58E-11	2.1E-12	3.1E+00	6.6E-12
Dieldrin	I	32	mg/kg	2.58E-08	2.1E-09	1.6E+01	3.4E-08
Arsenic	I	3.8	mg/kg	3.06E-09	2.5E-10	1.5E+01	3.8E-09
Lead	I	473	mg/kg	3.81E-07	3.1E-08	ND	
SUMMARY CANCER RISK							**4E-08**

[1] Toxicity equivalent factors are applied to carcinogenic PAHs per USEPA Region IV Guidance (USEPA, 1995).

TABLE G 18

INHALATION OF PARTICULATES - SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	2.82E-10	2.7E-10	ND	
Benzo(a)pyrene	O	370	ug/kg	2.98E-10	2.9E-10	ND	
Benzo(b)fluoranthene	O	410	ug/kg	3.31E-10	3.2E-10	ND	
Benzo(k)fluoranthene	O	390	ug/kg	3.15E-10	3.0E-10	ND	
Carbazole	O	97	ug/kg	7.82E-11	7.5E-11	ND	
Chyrsene	O	390	ug/kg	3.15E-10	3.0E-10	ND	
Dibenz(a,h)anthracene	O	390	ug/kg	3.15E-10	3.0E-10	ND	
Indeno(1,2,3-cd)pyrene	O	240	ug/kg	1.94E-10	1.9E-10	ND	
Dieldrin	I	320	mg/kg	2.58E-07	2.5E-07	ND	
Aluminum	I	11300	mg/kg	9.11E-06	8.7E-06	ND	
Arsenic	I	3.8	mg/kg	3.06E-09	2.9E-09	ND	
Cadmium	I	2.1	mg/kg	1.69E-09	1.6E-09	ND	
Iron	I	13900	mg/kg	1.12E-05	1.1E-05	ND	
Lead	I	473	mg/kg	3.81E-07	3.7E-07	ND	
Manganese	I	296	mg/kg	2.39E-07	2.3E-07	1.4E-05	1.6E-02
				SUMMARY HAZARD INDEX			0.02

TABLE 6-13

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1995
ABSORPTION FRACTION	ABS	chemical-specific	unitless	Assumption
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year [1]	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: **For noncarcinogenic effects, AT = ED**

TABLE 6-17

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)^-1	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene [1]	O	35	ug/kg	7.3E-10	7.3E+00	5.4E-09	0.01	8.4E-10	8.0E+00	6.8E-09	1.2E-08
Benzo(a)pyrene	O	370	ug/kg	7.8E-09	7.3E+00	5.7E-08	0.01	8.9E-09	8.0E+00	7.1E-08	1.3E-07
Benzo(b)fluoranthene [1]	O	41	ug/kg	8.6E-10	7.3E+00	6.3E-09	0.01	9.9E-10	8.0E+00	7.9E-09	1.4E-08
Benzo(k)fluoranthene [1]	O	3.9	ug/kg	8.2E-11	7.3E+00	6.0E-10	0.01	9.4E-11	8.0E+00	7.5E-10	1.3E-09
Carbazole	O	97	ug/kg	2.0E-09	2.0E-02	4.1E-11	0.01	2.3E-09	4.0E-02	9.4E-11	1.3E-10
Chrysene [1]	O	0.39	ug/kg	8.2E-12	7.3E+00	6.0E-11	0.01	9.4E-12	8.0E+00	7.5E-11	1.3E-10
Dibenz(a,h)anthracene [1]	O	240	ug/kg	5.0E-09	7.3E+00	3.7E-08	0.01	5.8E-09	8.0E+00	4.6E-08	8.3E-08
Indeno(1,2,3-cd)pyrene [1]	O	32	ug/kg	6.7E-10	7.3E+00	4.9E-09	0.01	7.7E-10	8.0E+00	6.2E-09	1.1E-08
Dieldrin	O	32	ug/kg	6.7E-10	1.6E+01	1.1E-08	0.01	7.7E-10	3.2E+01	2.5E-08	3.5E-08
Arsenic	I	3.8	mg/kg	8.0E-08	1.5E+00	1.2E-07	0.001	9.2E-09	1.5E+00	1.4E-08	1.3E-07
Lead	I	473	mg/kg	9.9E-06	ND		0.001	1.1E-06	ND		
SUMMARY CANCER RISK						2E-07				2E-07	4E-07

[1] Cacinogenic PAH concentrations are adjusted by their respective toxicity equivalent factors (USEPA, 1995).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

TABLE 6-19

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	2.1E-08	ND		0.01	2.4E-08	ND		
Benzo(a)pyrene	O	370	ug/kg	2.2E-08	ND		0.01	2.5E-08	ND		
Benzo(b)fluoranthene	O	410	ug/kg	2.4E-08	ND		0.01	2.8E-08	ND		
Benzo(k)fluoranthene	O	390	ug/kg	2.3E-08	ND		0.01	2.6E-08	ND		
Carbazole	O	97	ug/kg	5.7E-09	ND		0.01	6.5E-09	ND		
Chrysene	O	390	ug/kg	2.3E-08	ND		0.01	2.6E-08	ND		
Dibenz(a,h)anthracene	O	240	ug/kg	1.4E-08	ND		0.01	1.6E-08	ND		
Indeno(1,2,3-cd)pyrene	O	320	ug/kg	1.9E-08	ND		0.01	2.2E-08	ND		
Dieldrin	O	32	ug/kg	1.9E-09	5.0E-05	3.8E-05	0.01	2.2E-09	2.5E-05	8.6E-05	1.2E-04
Aluminum	I	11300	mg/kg	6.6E-04	1.0E+00	6.6E-04	0.001	7.6E-05	2.0E-01	3.8E-04	1.0E-03
Arsenic	I	3.8	mg/kg	2.2E-07	3.0E-04	7.4E-04	0.001	2.6E-08	2.9E-04	8.8E-05	8.3E-04
Cadmium	I	2.1	mg/kg	1.2E-07	1.0E-03	1.2E-04	0.001	1.4E-08	1.0E-05	1.4E-03	1.5E-03
Iron	I	13900	mg/kg	8.2E-04	3.0E-01	2.7E-03	0.001	9.4E-05	6.0E-03	1.6E-02	1.8E-02
Lead	I	473	mg/kg	2.8E-05	ND		0.001	3.2E-06	ND		
Manganese	I	296	mg/kg	1.7E-05	4.7E-02	3.7E-04	0.001	2.0E-06	1.9E-03	1.1E-03	1.4E-03
SUMMARY HAZARD INDEX						0.005				0.02	0.02

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE G-20

INHALATION OF PARTICULATES - SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	2.5	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogenic effects, AT = ED

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TABLE G20

INHALATION OF PARTICULATES - SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Benzo(a)anthracene	O	35	ug/kg	2.82E-11	2.4E-13	3.1E+00	7.3E-13
Benzo(a)pyrene	O	370	ug/kg	2.98E-10	2.5E-12	3.1E+00	7.8E-12
Benzo(b)fluoranthene	O	41	ug/kg	3.31E-11	2.8E-13	3.1E+00	8.6E-13
Benzo(k)fluoranthene	O	3.9	ug/kg	3.15E-12	2.6E-14	3.1E+00	8.2E-14
Chrysene	O	0.39	ug/kg	3.15E-13	2.6E-15	3.1E+00	8.2E-15
Dibenz(a,h)anthracene	O	240	ug/kg	1.94E-10	1.6E-12	3.1E+00	5.0E-12
Indeno(1,2,3-cd)pyrene	O	32	ug/kg	2.58E-11	2.2E-13	3.1E+00	6.7E-13
Dieldrin	I	32	mg/kg	2.58E-08	2.2E-10	1.6E+01	3.5E-09
Arsenic	I	3.8	mg/kg	3.06E-09	2.6E-11	1.5E+01	3.9E-10
Lead	I	473	mg/kg	3.81E-07	3.2E-09	ND	
SUMMARY CANCER RISK							4E-09

[1] Toxicity equivalent factors are applied to carcinogenic PAHs per USEPA Region IV Guidance (USEPA, 1995).

TABLE 6-20

INHALATION OF PARTICULATES - SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	2.82E-10	6.6E-12	ND	
Benzo(a)pyrene	O	370	ug/kg	2.98E-10	7.0E-12	ND	
Benzo(b)fluoranthene	O	410	ug/kg	3.31E-10	7.8E-12	ND	
Benzo(k)fluoranthene	O	390	ug/kg	3.15E-10	7.4E-12	ND	
Carbazole	O	97	ug/kg	7.82E-11	1.8E-12	ND	
Chyrsene	O	390	ug/kg	3.15E-10	7.4E-12	ND	
Dibenz(a,h)anthracene	O	390	ug/kg	3.15E-10	7.4E-12	ND	
Indeno(1,2,3-cd)pyrene	O	240	ug/kg	1.94E-10	4.5E-12	ND	
Dieldrin	I	320	mg/kg	2.58E-07	6.1E-09	ND	
Aluminum	I	11300	mg/kg	9.11E-06	2.1E-07	ND	
Arsenic	I	3.8	mg/kg	3.06E-09	7.2E-11	ND	
Cadmium	I	2.1	mg/kg	1.69E-09	4.0E-11	ND	
Iron	I	13900	mg/kg	1.12E-05	2.6E-07	ND	
Lead	I	473	mg/kg	3.81E-07	9.0E-09	ND	
Manganese	I	296	mg/kg	2.39E-07	5.6E-09	1.4E-05	4.0E-04
				SUMMARY HAZARD INDEX			0.0004

TABLE 6-21

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1992
ABSORPTION FRACTION	ABS	chemical-specific	unitless	Assumption
SURFACE AREA EXPOSED	SA	2,300	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	250	days/year [1]	USEPA, 1995
EXPOSURE DURATION	ED	25	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_{\text{INGESTION}} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_{\text{DERMAL}} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: For noncarcinogenic effects, AT = ED

TABLE [illegible]

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene [1]	O	35	ug/kg	6.1E-09	7.3E+00	4.5E-08	0.01	2.8E-09	8.0E+00	2.3E-08	6.7E-08
Benzo(a)pyrene	O	370	ug/kg	6.5E-08	7.3E+00	4.7E-07	0.01	3.0E-08	8.0E+00	2.4E-07	7.1E-07
Benzo(b)fluoranthene [1]	O	41	ug/kg	7.2E-09	7.3E+00	5.2E-08	0.01	3.3E-09	8.0E+00	2.6E-08	7.9E-08
Benzo(k)fluoranthene [1]	O	3.9	ug/kg	6.8E-10	7.3E+00	5.0E-09	0.01	3.1E-10	8.0E+00	2.5E-09	7.5E-09
Carbazole	O	97	ug/kg	1.7E-08	2.0E-02	3.4E-10	0.01	7.8E-09	4.0E-02	3.1E-10	6.5E-10
Chrysene [1]	O	0.39	ug/kg	6.8E-11	7.3E+00	5.0E-10	0.01	3.1E-11	8.0E+00	2.5E-10	7.5E-10
Dibenz(a,h)anthracene [1]	O	240	ug/kg	4.2E-08	7.3E+00	3.1E-07	0.01	1.9E-08	8.0E+00	1.5E-07	4.6E-07
Indeno(1,2,3-cd)pyrene [1]	O	32	ug/kg	5.6E-09	7.3E+00	4.1E-08	0.01	2.6E-09	8.0E+00	2.1E-08	6.1E-08
Dieldrin	O	32	ug/kg	5.6E-09	1.6E+01	8.9E-08	0.01	2.6E-09	3.2E+01	8.2E-08	1.7E-07
Arsenic	I	3.8	mg/kg	6.6E-07	1.5E+00	1.0E-06	0.001	3.1E-08	1.5E+00	4.6E-08	1.0E-06
Lead	I	473	mg/kg	8.3E-05	ND		0.001	3.8E-06	ND		
SUMMARY CANCER RISK						2E-06				6E-07	3E-06

[1] Cacinogenic PAH concentrations are adjusted by their respective toxicity equivalent factors (USEPA, 1995).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

TABLE 6.21

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	1.7E-07	ND		0.01	7.9E-08	ND		
Benzo(a)pyrene	O	370	ug/kg	1.8E-07	ND		0.01	8.3E-08	ND		
Benzo(b)fluoranthene	O	410	ug/kg	2.0E-07	ND		0.01	9.2E-08	ND		
Benzo(k)fluoranthene	O	390	ug/kg	1.9E-07	ND		0.01	8.8E-08	ND		
Carbazole	O	97	ug/kg	4.7E-08	ND		0.01	2.2E-08	ND		
Chrysene	O	390	ug/kg	1.9E-07	ND		0.01	8.8E-08	ND		
Dibenz(a,h)anthracene	O	240	ug/kg	1.2E-07	ND		0.01	5.4E-08	ND		
Indeno(1,2,3-cd)pyrene	O	320	ug/kg	1.6E-07	ND		0.01	7.2E-08	ND		
Dieldrin	O	32	ug/kg	1.6E-08	5.0E-05	3.1E-04	0.01	7.2E-09	2.5E-05	2.9E-04	6.0E-04
Aluminum	I	11300	mg/kg	5.5E-03	1.0E+00	5.5E-03	0.001	2.5E-04	2.0E-01	1.3E-03	6.8E-03
Arsenic	I	3.8	mg/kg	1.9E-06	3.0E-04	6.2E-03	0.001	8.6E-08	2.9E-04	2.9E-04	6.5E-03
Cadmium	I	2.1	mg/kg	1.0E-06	1.0E-03	1.0E-03	0.001	4.7E-08	1.0E-05	4.7E-03	5.8E-03
Iron	I	13900	mg/kg	6.8E-03	3.0E-01	2.3E-02	0.001	3.1E-04	6.0E-03	5.2E-02	7.5E-02
Lead	I	473	mg/kg	2.3E-04	ND		0.001	1.1E-05	ND		
Manganese	I	296	mg/kg	1.4E-04	4.7E-02	3.1E-03	0.001	6.7E-06	1.9E-03	3.5E-03	6.6E-03
SUMMARY HAZARD INDEX						0.04				0.06	0.1

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE 6A2

INHALATION OF PARTICULATES - SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.833	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	250	days/year	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$$CA = C \times CF \times (1/PEF)$$

Note: For noncarcinogenic effects, AT = ED.

TABLE G-12

INHALATION OF PARTICULATES - SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Benzo(a)anthracene	O	35	ug/kg	2.82E-11	6.6E-13	3.1E+00	2.0E-12
Benzo(a)pyrene	O	370	ug/kg	2.98E-10	6.9E-12	3.1E+00	2.2E-11
Benzo(b)fluoranthene	O	41	ug/kg	3.31E-11	7.7E-13	3.1E+00	2.4E-12
Benzo(k)fluoranthene	O	3.9	ug/kg	3.15E-12	7.3E-14	3.1E+00	2.3E-13
Chrysene	O	0.39	ug/kg	3.15E-13	7.3E-15	3.1E+00	2.3E-14
Dibenz(a,h)anthracene	O	240	ug/kg	1.94E-10	4.5E-12	3.1E+00	1.4E-11
Indeno(1,2,3-cd)pyrene	O	32	ug/kg	2.58E-11	6.0E-13	3.1E+00	1.9E-12
Dieldrin	I	32	mg/kg	2.58E-08	6.0E-10	1.6E+01	9.6E-09
Arsenic	I	3.8	mg/kg	3.06E-09	7.1E-11	1.5E+01	1.1E-09
Lead	I	473	mg/kg	3.81E-07	8.9E-09	ND	
				SUMMARY CANCER RISK			1E-08

[1] Toxicity equivalent factors are applied to carcinogenic PAHs per USEPA Region IV Guidance (USEPA, 1995).

TABLE 6-22

INHALATION OF PARTICULATES - SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	2.82E-10	1.8E-11	ND	
Benzo(a)pyrene	O	370	ug/kg	2.98E-10	1.9E-11	ND	
Benzo(b)fluoranthene	O	410	ug/kg	3.31E-10	2.2E-11	ND	
Benzo(k)fluoranthene	O	390	ug/kg	3.15E-10	2.1E-11	ND	
Carbazole	O	97	ug/kg	7.82E-11	5.1E-12	ND	
Chyrsene	O	390	ug/kg	3.15E-10	2.1E-11	ND	
Dibenz(a,h)anthracene	O	390	ug/kg	3.15E-10	2.1E-11	ND	
Indeno(1,2,3-cd)pyrene	O	240	ug/kg	1.94E-10	1.3E-11	ND	
Dieldrin	I	320	mg/kg	2.58E-07	1.7E-08	ND	
Aluminum	I	11300	mg/kg	9.11E-06	5.9E-07	ND	
Arsenic	I	3.8	mg/kg	3.06E-09	2.0E-10	ND	
Cadmium	I	2.1	mg/kg	1.69E-09	1.1E-10	ND	
Iron	I	13900	mg/kg	1.12E-05	7.3E-07	ND	
Lead	I	473	mg/kg	3.81E-07	2.5E-08	ND	
Manganese	I	296	mg/kg	2.39E-07	1.6E-08	1.4E-05	1.1E-03
SUMMARY HAZARD INDEX							0.001

TABLE 6A3

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	480	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year [1]	Assumption
EXPOSURE DURATION	ED	1	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	1	years	USEPA, 1991

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_{\text{INGESTION}} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_{\text{DERMAL}} = \frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: For noncarcinogenic effects, AT = ED

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TABLE 623

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene [1]	O	35	ug/kg	2.8E-10	7.3E+00	2.1E-09	0.01	3.4E-11	8.0E+00	2.7E-10	2.3E-09
Benzo(a)pyrene	O	370	ug/kg	3.0E-09	7.3E+00	2.2E-08	0.01	3.6E-10	8.0E+00	2.9E-09	2.5E-08
Benzo(b)fluoranthene [1]	O	41	ug/kg	3.3E-10	7.3E+00	2.4E-09	0.01	4.0E-11	8.0E+00	3.2E-10	2.7E-09
Benzo(k)fluoranthene [1]	O	3.9	ug/kg	3.1E-11	7.3E+00	2.3E-10	0.01	3.8E-12	8.0E+00	3.0E-11	2.6E-10
Carbazole	O	97	ug/kg	7.8E-10	2.0E-02	1.6E-11	0.01	9.4E-11	4.0E-02	3.7E-12	1.9E-11
Chrysene [1]	O	0.39	ug/kg	3.1E-12	7.3E+00	2.3E-11	0.01	3.8E-13	8.0E+00	3.0E-12	2.6E-11
Dibenz(a,h)anthracene [1]	O	240	ug/kg	1.9E-09	7.3E+00	1.4E-08	0.01	2.3E-10	8.0E+00	1.9E-09	1.6E-08
Indeno(1,2,3-cd)pyrene [1]	O	32	ug/kg	2.6E-10	7.3E+00	1.9E-09	0.01	3.1E-11	8.0E+00	2.5E-10	2.1E-09
Dieldrin	O	32	ug/kg	2.6E-10	1.6E+01	4.1E-09	0.01	3.1E-11	3.2E+01	9.9E-10	5.1E-09
Arsenic	I	3.8	mg/kg	3.1E-08	1.5E+00	4.6E-08	0.001	3.7E-10	1.5E+00	5.5E-10	4.6E-08
Lead	I	473	mg/kg	3.8E-06	ND		0.001	4.6E-08	ND		
SUMMARY CANCER RISK						**9E-08**				**7E-09**	**1E-07**

[1] Cacinogenic PAH concentrations are adjusted by their respective toxicity equivalent factors (USEPA, 1995)
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

TABLE G23

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD [1] (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [3] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	2.0E-07	ND		0.01	2.4E-08	ND		
Benzo(a)pyrene	O	370	ug/kg	2.1E-07	ND		0.01	2.5E-08	ND		
Benzo(b)fluoranthene	O	410	ug/kg	2.3E-07	ND		0.01	2.8E-08	ND		
Benzo(k)fluoranthene	O	390	ug/kg	2.2E-07	ND		0.01	2.6E-08	ND		
Carbazole	O	200	ug/kg	1.1E-07	ND		0.01	1.4E-08	ND		
Chrysene	O	390	ug/kg	2.2E-07	ND		0.01	2.6E-08	ND		
Dibenz(a,h)anthracene	O	240	ug/kg	1.4E-07	ND		0.01	1.6E-08	ND		
Indeno(1,2,3-cd)pyrene	O	320	ug/kg	1.8E-07	ND		0.01	2.2E-08	ND		
Dieldrin	O	32	ug/kg	1.8E-08	5.0E-05	3.6E-04	0.01	2.2E-09	2.5E-05	8.6E-05	4.5E-04
Aluminum	I	11300	mg/kg	6.4E-03	1.0E+00	6.4E-03	0.001	7.6E-05	2.0E-01	3.8E-04	6.8E-03
Arsenic	I	3.8	mg/kg	2.1E-06	3.0E-04	7.1E-03	0.001	2.6E-08	2.9E-04	8.8E-05	7.2E-03
Cadmium	I	2.1	mg/kg	1.2E-06	1.0E-03	1.2E-03	0.001	1.4E-08	1.0E-05	1.4E-03	2.6E-03
Iron	I	13900	mg/kg	7.8E-03	3.0E-01	2.6E-02	0.001	9.4E-05	6.0E-03	1.6E-02	4.2E-02
Lead	I	473	mg/kg	2.7E-04	ND		0.001	3.2E-06	ND		
Manganese	I	296	mg/kg	1.7E-04	4.7E-02	3.5E-03	0.001	2.0E-06	1.9E-03	1.1E-03	4.6E-03
SUMMARY HAZARD INDEX						0.04				0.02	0.06

[1] Subchronic Rfd values were used for the excavation worker due to short exposure scenario.
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (USEPA, 1995).
[3] Calculated from oral RfDs.

TABLE G24

INHALATION OF PARTICULATES - SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	2.5	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	1	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	1	years	USEPA, 1991

[1] Florida *Soil Clean-Up Goal Variable*. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
Standard Default Exposure Factors; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

Where:

$$CA = C \times CF \times (1/PEF)$$

Note: **For noncarcinogens, AT = ED.**

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TABLE 6.24

INHALATION OF PARTICULATES - SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Benzo(a)anthracene	O	35	ug/kg	2.82E-11	9.5E-15	3.1E+00	2.9E-14
Benzo(a)pyrene	O	370	ug/kg	2.98E-10	1.0E-13	3.1E+00	3.1E-13
Benzo(b)fluoranthene	O	41	ug/kg	3.31E-11	1.1E-14	3.1E+00	3.4E-14
Benzo(k)fluoranthene	O	3.9	ug/kg	3.15E-12	1.1E-15	3.1E+00	3.3E-15
Chrysene	O	0.39	ug/kg	3.15E-13	1.1E-16	3.1E+00	3.3E-16
Dibenz(a,h)anthracene	O	240	ug/kg	1.94E-10	6.5E-14	3.1E+00	2.0E-13
Indeno(1,2,3-cd)pyrene	O	32	ug/kg	2.58E-11	8.7E-15	3.1E+00	2.7E-14
Dieldrin	I	32	mg/kg	2.58E-08	8.7E-12	1.6E+01	1.4E-10
Arsenic	I	3.8	mg/kg	3.06E-09	1.0E-12	1.5E+01	1.5E-11
Lead	I	473	mg/kg	3.81E-07	1.3E-10	ND	
SUMMARY CANCER RISK							2E-10

[1] Toxicity equivalent factors are applied to carcinogenic PAHs per USEPA Region IV Guidance (USEPA, 1995).

TABLE G24

INHALATION OF PARTICULATES - SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	2.82E-10	6.6E-12	ND	
Benzo(a)pyrene	O	370	ug/kg	2.98E-10	7.0E-12	ND	
Benzo(b)fluoranthene	O	410	ug/kg	3.31E-10	7.8E-12	ND	
Benzo(k)fluoranthene	O	390	ug/kg	3.15E-10	7.4E-12	ND	
Carbazole	O	97	ug/kg	7.82E-11	1.8E-12	ND	
Chyrsene	O	390	ug/kg	3.15E-10	7.4E-12	ND	
Dibenz(a,h)anthracene	O	390	ug/kg	3.15E-10	7.4E-12	ND	
Indeno(1,2,3-cd)pyrene	O	240	ug/kg	1.94E-10	4.5E-12	ND	
Dieldrin	I	320	mg/kg	2.58E-07	6.1E-09	ND	
Aluminum	I	11300	mg/kg	9.11E-06	2.1E-07	ND	
Arsenic	I	3.8	mg/kg	3.06E-09	7.2E-11	ND	
Cadmium	I	2.1	mg/kg	1.69E-09	4.0E-11	ND	
Iron	I	13900	mg/kg	1.12E-05	2.6E-07	ND	
Lead	I	473	mg/kg	3.81E-07	9.0E-09	ND	
Manganese	I	296	mg/kg	2.39E-07	5.6E-09	1.4E-05	4.0E-04
				SUMMARY HAZARD INDEX			0.0004

TABLE G25

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SUBSURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MELTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical specific	
INGESTION RATE	IR	480	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1995
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year [1]	Assumption
EXPOSURE DURATION	ED	1	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	1	years	USEPA, 1991

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors";
OSWER Directive 9285.6-03.
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_{DERMAL} = \frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: For noncarcinogenic effects, AT = ED

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TABLE G-25

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SUBSURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MELTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	15.1	mg/kg	1.2E-07	1.5E+00	1.8E-07	0.001	1.5E-09	1.5E+00	2.2E-09	1.8E-07
SUMMARY CANCER RISK						**2E-07**				**2E-09**	**2E-07**

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.
NE = not evaluated.

TABLE G25

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SUBSURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MELTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Arsenic	I	15.1	mg/kg	8.5E-06	3.0E-04	2.8E-02	0.001	1.0E-07	2.9E-04	3.5E-04	2.9E-02
Iron	I	74800	mg/kg	4.2E-02	3.0E-01	1.4E-01	0.001	5.1E-04	6.0E-03	8.4E-02	2.2E-01
Lead	I	766	mg/kg	4.3E-04	ND		0.001	5.2E-06	ND		
SUMMARY HAZARD INDEX						**0.2**				**0.08**	**0.3**

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.
ND = no data available.

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TABLE G26

INHALATION OF PARTICULATES - SUBSURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MELTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	12000000	m^3/kg	#REF!
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	2.5	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	1	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	1	years	USEPA, 1991

[1] PEF has been derived in the PEF Appendix to this report.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

Where:

$$CA = C \times CF \times (1/PEF)$$

Note: For noncarcinogens, AT = ED.

TABLE 6.2b

INHALATION OF PARTICULATES - SUBSURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MELTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Arsenic	I	15.1	mg/kg	1.26E-06	4.2E-10	1.5E+01	6.3E-09
SUMMARY CANCER RISK							6E-09
NE = not evaluated.							

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TABLE 6.26

INHALATION OF PARTICULATES - SUBSURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MELTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Arsenic	I	15.1	mg/kg	1.26E-06	3.0E-08	ND	
Iron	I	74800	mg/kg	6.23E-03	1.5E-04	ND	
Lead	I	766	mg/kg	6.38E-05	1.5E-06	ND	
				SUMMARY HAZARD INDEX			0E+00

ND = no data available.

TABLE G-27

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)
ADULT RESIDENT
SITE 11
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE	IR	2	liters/day	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	24	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Region IV Supplemental Gudance to RAGS, Bulletin No. 3, November.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CW \times IR \times EF \times ED \times CF}{BW \times AT \times 365 \text{ days/year}}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE 6-27

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)
ADULT RESIDENT
SITE 11
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK INGESTION
1,2-Dichlorethane	9.9	UG/LITER	9.3E-05	9.1E-02	8.5E-06
Benzene	180	UG/LITER	1.7E-03	2.9E-02	4.9E-05
Chloroform	1	UG/LITER	9.4E-06	6.1E-03	5.7E-08
Trichlorethene	5.5	UG/LITER	5.2E-05	1.1E-02	5.7E-07
4,4-DDT	0.06	UG/LITER	5.6E-07	3.4E-01	1.9E-07
bis(2-Ethylhexyl)phthalate	6.9	UG/LITER	6.5E-05	1.4E-02	9.1E-07
Arsenic	3.3	UG/LITER	3.1E-05	1.5E+00	4.6E-05
			TOTAL CANCER RISK		1E-04

TABLE G27

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)
ADULT RESIDENT
SITE 11
MILTON, FLORIDA

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
1,2-Dichloroethane	9.9	UG/LITER	2.7E-04	3.0E-01	9.0E-04
1,2-Dichloroethene	9.1	UG/LITER	2.5E-04	9.0E-03	2.8E-02
Benzene	180	UG/LITER	4.9E-03	3.0E-04	1.6E+01
Chloroform	1	UG/LITER	2.7E-05	1.0E-02	2.7E-03
Trichloroethene	5.5	UG/LITER	1.5E-04	6.0E-03	2.5E-02
bis(2-Ethylhexyl)phthalate	6.9	UG/LITER	1.9E-04	2.0E-02	9.5E-03
4,4-DDT	0.06	UG/LITER	1.6E-06	5.0E-04	3.3E-03
Aluminum	491	UG/LITER	1.3E-02	1.0E+00	1.3E-02
Arsenic	3.3	UG/LITER	9.0E-05	3.0E-04	3.0E-01
Barium	53.9	UG/LITER	1.5E-03	7.0E-02	2.1E-02
Cadmium	2.6	UG/LITER	7.1E-05	5.0E-04	1.4E-01
Iron	4570	UG/LITER	1.3E-01	3.0E-01	4.2E-01
Manganese	188	UG/LITER	5.2E-03	4.7E-02	1.1E-01
			TOTAL HAZARD INDEX		18

ND = no data available.

Ck...NG

TABLE 628

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)
CHILD RESIDENT
SITE 16
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE	IR	1	liters/day	USEPA, 1995
BODY WEIGHT	BW	15	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	6	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Region IV Supplemental Gudance to RAGS, Bulletin No. 3, November.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CW \times IR \times EF \times ED \times CF}{BW \times AT \times 365 \text{ days/year}}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE 6.25

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)
CHILD RESIDENT
SITE 16
MILTON, FLORDIA

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
1,2-Dichloroethane	9.9	UG/LITER	6.3E-04	3.0E-01	2.1E-03
1,2-Dichloroethene	9.1	UG/LITER	5.8E-04	9.0E-03	6.5E-02
Benzene	180	UG/LITER	1.2E-02	3.0E-04	3.8E+01
Chloroform	1	UG/LITER	6.4E-05	1.0E-02	6.4E-03
Trichloroethene	5.5	UG/LITER	3.5E-04	6.0E-03	5.9E-02
bis(2-Ethylhexyl)phthalate	6.9	UG/LITER	4.4E-04	2.0E-02	2.2E-02
4,4-DDT	0.06	UG/LITER	3.8E-06	5.0E-04	7.7E-03
Aluminum	491	UG/LITER	3.1E-02	1.0E+00	3.1E-02
Arsenic	3.3	UG/LITER	2.1E-04	3.0E-04	7.0E-01
Barium	53.9	UG/LITER	3.4E-03	7.0E-02	4.9E-02
Cadmium	2.6	UG/LITER	1.7E-04	5.0E-04	3.3E-01
Iron	4570	UG/LITER	2.9E-01	3.0E-01	9.7E-01
Manganese	188	UG/LITER	1.2E-02	4.7E-02	2.6E-01
			TOTAL HAZARD INDEX		41

TABLE 629

INHALATION EXPOSURE TO VOCs WHILE SHOWERING
ADULT RESIDENT
SITE 16
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SHOWER AIR	CA [1]	chemical	ug/m^3	Modeled
CONVERSION FACTOR 1	CF_1	1.4	hours/day	USEPA, 1992
EXPOSURE TIME SHOWER	ET	70	hours/day	USEPA, 1991
EXPOSURE FREQUENCY	EF	0.001	days/year	
EXPOSURE DURATION	ED	350	years	USEPA, 1992
CONVERSION FACTOR 2	CF_2	7	days/year	USEPA, 1992
AVERAGING TIME CANCER	AT		years	
AVERAGING TIME NONCANCER	AT	70	years	USEPA, 1991
[1] Calculated via model by Foster and Chrostowski, Air Pollution Control As		7		USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors": OSWER Directive 9285.6-03.
USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.

EQUATIONS

CANCER RISK = AVG. CONC. (ug/m^3) * CANCER UNIT RISK (ug/m^3)$^{-1}$

HAZARD QUOTIENT = AVG.CONC.(ug/m^3)/REF. CONC. (ug/m^3)

$$\text{AVG. CONC.} = \frac{CA \cdot EF \cdot ET \cdot ED}{AT \cdot CF1 \cdot CF2}$$

TABLE G29

INHALATION EXPOSURE TO VOCs WHILE SHOWERING
ADULT RESIDENT
SITE 16
MILTON, FLORDIA

CARCINOGENIC EFFECTS

COMPOUND	VOLATILE OR NON-VOLATILE? V/NV	SHOWER AIR CONCENTRATION (ug/m^3)	AVERAGE AIR CONCENTRATION LIFETIME (ug/m^3)	INHALATION CANCER UNIT RISK (ug/m^3)$^{-1}$	CANCER RISK
1,2-Dichloroethane	V	4.1E+01	1.1E-01	2.6E-05	2.9E-06
Benzene	V	9.6E+02	2.6E+00	8.3E-06	2.2E-05
Chloroform	V	4.4E+00	1.2E-02	2.3E-05	2.8E-07
Trichloroethene	V	2.4E+01	6.6E-02	2.0E-06	1.3E-07
4,4-DDT	NV	NA	NA	9.7E-05	NA
Arsenic	NV	NA	NA	4.3E-03	NA
Cadmium	NV	NA	NA	1.8E-03	NA
			SUMMARY CANCER RISK		3E-05

NA = not applicable. This analyte is not volatile and has therefore not been evaluated via this volatilization model.

TABLE 627

INHALATION EXPOSURE TO VOCs WHILE SHOWERING
ADULT RESIDENT
SITE 16
MILTON, FLORIDA

NONCARCINOGENIC EFFECTS

COMPOUND	VOLATILE OR NON-VOLATILE? V/NV	SHOWER AIR CONCENTRATION (ug/m^3)	AVERAGE AIR CONCENTRATION FOR TIME PERIOD (ug/m^3)	CHRONIC INHALATION RfC [1] (ug/m^3)	HAZARD QUOTIENT
1,2-Dichloroethane	V	4.1E+01	3.3E-01	ND	
1,2-Dichloroethene (total)	V	4.5E+01	3.6E-01	ND	
Benzene	V	9.6E+02	7.7E+00	ND	
Chloroform	V	4.4E+00	3.5E-02	ND	
Trichloroethene	V	2.4E+01	1.9E-01	ND	
bis(2-Ethylhexyl)phthalate	NV	ND	NA	ND	
4,4-DDT	NV	ND	NA	ND	
Aluminum	NV	ND	NA	ND	
Arsenic	NV	ND	NA	ND	
Barium	NV	ND	NA	5.0E-04	
Cadmium	NV	ND	NA	ND	
Iron	NV	ND	NA	ND	
Manganese	NV	ND	NA	5.0E-05	
			SUMMARY HAZARD INDEX		0.00

[1] RfC is the Reference Concentration published by USEPA.
ND = no data available.
NA = not applicable. The analyte is not volatile and has therefore not been evaluated via this volatilization model.

TABLE G30

CONCENTRATION OF VOCs WHILE SHOWERING
ADULT RESIDENT
SITE 16
MILTON, FLORDIA

EMPIRICAL CONSTANTS

CONSTANT	SYMBOL	VALUE	UNIT	SOURCE
Liquid-film mass transfer for CO_2	K_l (CO_2)	20	cm/hr	Calculated
Gas-film mass transfer for water	K_g (H_2O)	3000	cm/hr	Calculated
Molar gas constant x Temperature	RT	0.024	atm-m^3/mole	
Reference temperature	T_l	293	K	
Temperature of shower water	T_s	318	K	Assumption
Viscosity of water at shower temperature	u_s	0.6178	cp	Calculated
Viscosity of water at reference temperature	u_l	0.65	cp	Calculated
Shower droplet free-fall time	t_s	1.5	sec	Assumption
Droplet diameter	d	1	mm	Foster & Chrostowski, 1987
Flow rate in shower	FR	20	l/min	Assumption
Volume of shower area	SV	12	m^3	Assumption
Air exchange rate	R	0.03	min^{-1}	Calculated
Time in shower	D_s	12	min	USEPA, 1989
Time at which concentration is being calculated	t	12	min	Assumption

Foster, S.A. and Chrostowski, P.C., 1987. Inhalation Exposures to Volatile Organic Contaminants in the Shower.
USEPA, 1989, Exposure Factors Handbook; EPA/600/8-89/043, May 1989.
All equations and definitions of terms are presented in the Appendix to this report, Calculation of Air Concentration Using the Shower Model.

TABLE G30

CONCENTRATION OF VOCs WHILE SHOWERING
ADULT RESIDENT
SITE 16
MILTON, FLORDIA
INTERIM CORRECTIVE MEASURE

SHOWER CONCENTRATIONS

COMPOUND	C_w (ug/l)	MW (g/mol)	H (atm-m³/mol)	k_l (cm/hr)	k_g (cm/hr)	K_L (cm/hr)	K_{al} (cm/hr)	C_{wd} (µg/l)	S (µg/m³-min)	$C_{(voc)}$ (µg/m³)
1,2-Dichloroethane	9.9	99.0	0.00098	1.3E+01	1.3E+03	1.1E+01	1.1E+01	2.4E+00	4.1E+00	**4.1E+01**
1,2-Dichloroethene (total)	9.1	97.0	0.00758	1.3E+01	1.3E+03	1.3E+01	1.4E+01	2.7E+00	4.5E+00	**4.5E+01**
Benzene	180	78.0	0.0056	1.5E+01	1.4E+03	1.4E+01	1.5E+01	5.7E+01	9.6E+01	**9.6E+02**
Chloroform	1	120.0	0.0037	1.2E+01	1.2E+03	1.1E+01	1.2E+01	2.6E-01	4.4E-01	**4.4E+00**
Trichloroethene	5.5	130.0	0.01	1.2E+01	1.1E+03	1.1E+01	1.2E+01	1.4E+00	2.4E+00	**2.4E+01**

C_w = Concentration in groundwater

MW = Molecular weight

H = Henry's Law constant

k_l = Chemical-specific mass-transfer coefficient

k_g = Chemical-specific gas mass-transfer coefficient

K_L = Mass transfer coefficient

K_{al} = Temperature correction of mass transfer coefficient

C_{wd} = Analyte concentration in water droplet

S = Release rate of analyte to air

$C_{(voc)}$ = Analyte concentration in bathroom air at time t.

$$C_{(voc)} = (S/R) \times (e^{(RDs)}-1) \times e^{(-Rt)}$$

TABLE C-31

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT TRESPASSER - WADING
SITE 16
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical specific	ug/liter	
INGESTION RATE [1]	IR	0.026	liters/day	USEPA, 1995
SURFACE AREA [2]	SA	5,750	cm^2	USEPA, 1992
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	70	kg	USEPA, 1991
DOSE ABSORBED PER EVENT	DA_{event}	chemical specific	mg/cm^2-event	Calculated
EXPOSURE TIME	ET	2.6	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	20	years	Assumption
DIFFUSION DEPTH PER EVENT	PC_{event}	chemical specific	cm/event	[3]
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	20	years	Assumption
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm^3	

[1] Ingestion Rate = 0.026 l/day = 10 ml/hour x 2.6 hours/day x 0.001 l/ml
[2] Surface area assumes lower legs, hands, and feet are exposed.
[3] PCevent is calculated in the Dermal Guidance See Table C-35.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters";
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)$^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DA_{event} \times EV \times EF \times ED \times SA}{AT \times BW \times 365\ \text{days/yr}}$$

Where:
$DA_{event} = PC_{event} \times CW \times CF1 \times CF2$

Note: For noncarcinogenic effects, AT = ED.

TABLE G31

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT TRESPASSER - WADING
SITE 16
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF	CANCER RISK INGESTION	PCEVENT [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2]	CANCER RISK DERMAL	TOTAL CANCER RISK
Beryllium	0.21	ug/L	2.7E-09	4.3E+00	1.2E-08	0.0026	1.6E-09	4.3E+02	6.8E-07	**6.9E-07**
			SUMMARY CANCER RISK		**1E-08**				**7E-07**	**7E-07**

[1] This chemical-specific value has been calculated in Table C-45.
[2] This chemical-specific value is calculated in Table C-35.
NE = not evaluated.

TABLE G31

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT TRESPASSER - WADING
SITE 16
MILTON, FLORIDA

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCEVENT[1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Beryllium	0.21	ug/L	9.6E-09	5.0E-03	1.9E-06	0.0026	5.5E-09	5.0E-05	1.1E-04	**1.1E-04**
SUMMARY HAZARD INDEX					**2E-06**				**1E-04**	**1E-04**

[1] This chemical-specific value has been calculated in Table C-35.
[2] Calculated from oral RfDs.
ND = no data available.

TABLE C-32

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADOLESCENT TRESPASSER - WADING
SITE 16
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE [1]	IR	0.026	liters/day	USEPA, 1995
AGE-SPECIFIC SURFACE AREA [2]	SA	age-specific	cm^2	USEPA, 1989
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	45	kg	USEPA, 1995
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	Calculated
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	10	years	USEPA, 1995
AGE-WEIGHTED SURFACE AREA [3]	SAsw/adj	1013	cm^2-yr/kg	Calculated per USEPA, 1992
DIFFUSION DEPTH PER EVENT [4]	PC_{event}	chemical-specific	cm/event	Calculated per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	10	years	USEPA, 1995
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm^3	

[1] Ingestion Rate = 0.026 l/day = 10 ml/hour x 2.6 hours/day x 0.001 l/ml
[2] Surface area assumes lower legs, hands, and feet are exposed.
[3] PCevent is calculated in the Dermal Guidance See Table C-35.

USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters";
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DA_{event} \times EV \times EF \times SAsw/adj}{AT \times 365 \text{ days/yr}}$$

Where:

SAsw/adj = Sum (SA x ED / BW)

$DA_{event} = PC_{event} \times CW \times CF1 \times CF2$

Note: For noncarcinogenic effects, AT = ED.

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF	CANCER RISK INGESTION	PCEVENT [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2]	CANCER RISK DERMAL	TOTAL CANCER RISK
Beryllium	0.21	ug/L	2.1E-09	4.3E+00	9.2E-09	0.0026	9.7E-10	4.3E+02	4.2E-07	4.3E-07
SUMMARY CANCER RISK					9E-09				4E-07	4E-07

[1] This chemical-specific value has been calculated in Table C-45.
[2] This chemical-specific value is calculated in Table C-35.
ND = no data available.

TABLE G32

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADOLESCENT TRESPASSER - WADING
SITE 16
MILTON, FLORIDA

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCEVENT [1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Beryllium	0.21	ug/L	1.5E-08	5.0E-03	3.0E-06	0.0026	6.8E-09	5.0E-05	1.4E-04	1.4E-04
			SUMMARY HAZARD INDEX		3E-06				1E-04	1E-04

[1] This chemical-specific value has been calculated in Table C-35.
[2] Calculated from oral RfDs.
ND = no data available.

TABLE 6-33

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT RESIDENT - WADING
SITE 16
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE [1]	IR	0.026	liters/day	USEPA, 1995
SURFACE AREA [2]	SA	5,750	cm2	USEPA, 1989
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	70	kg	USEPA, 1991
DOSE ABSORBED PER EVENT	DAevent	chemical-specific	mg/cm2-event	Calculated
EXPOSURE TIME	ET	2.6	hours/day	Assumption
EXPOSURE FREQUENCY	EF	100	days/year	Assumption
EXPOSURE DURATION	ED	24	years	Assumption
DIFFUSION DEPTH PER EVENT	PCevent	chemical-specific	cm/event	Calculated per USEPA, 1992 [3]
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1995
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm3	

[1] Ingestion Rate = 0.026 l/day = 10 ml/hour x 2.6 hours/day x 0.001 l/ml
[2] Surface area assumes lower legs, hands, and feet are exposed.
[3] PCevent is calculated in the Dermal Guidance Appendix to this report

USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
USEPA, 1991. *Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters."*
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DAevent \times EV \times EF \times ED \times SA}{AT \times BW \times 365\ \text{days/yr}}$$

Where:
DAevent = PCevent x CW x CF1 x CF2

Note: *For noncarcinogenic effects, AT = ED.*

TABLE G33

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT RESIDENT - WADING
SITE 16
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	PCEVENT[2] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1, 3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Beryllium	0.21	ug/L	3.3E-09	4.3E+00	1.4E-08	0.0026	1.9E-09	4.3E+02	8.2E-07	**8.3E-07**
SUMMARY CANCER RISK					**1E-08**				**8E-07**	**8E-07**

[1] This chemical-specific value has been calculated in Table C-45.
[2] This chemical-specific value is calculated in Table C-35.
[3] *Calculated from oral CSFs.*
ND = no data available.

TABLE G33

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT RESIDENT - WADING
SITE 16
MILTON, FLORIDA

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCEVENT[1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)^-1	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Beryllium	0.21	ug/L	9.6E-09	5.0E-03	1.9E-06	0.0026	5.5E-09	5.0E-05	1.1E-04	1.1E-04
SUMMARY HAZARD INDEX					2E-06				1E-04	1E-04

[1] This chemical-specific value has been calculated in Table C-35.
[2] Calculated from oral RfDs.
ND = no data available.

TABLE G34

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
CHILD RESIDENT - WADING
SITE 16
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE [1]	IR	0.13	liters/day	USEPA, 1995
AGE-SPECIFIC SURFACE AREA [2]	SA	age-specific	cm^2	USEPA, 1989
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	15	kg	USEPA, 1991
DOSE ABSORBED PER EVENT	DA_{event}	chemical specific	mg/cm^2-event	Calculated
EXPOSURE FREQUENCY	EF	100	days/year	Assumption
EXPOSURE DURATION	ED	6	years	Assumption
AGE-WEIGHTED SURFACE AREA [3]	SAsw/adj	766	cm^2-yr/kg	Calculated per USEPA, 1992
DIFFUSION DEPTH PER EVENT [4]	PC_{event}	chemical-specific	cm/event	Calculated per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	Assumption
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm^3	

[1] Ingestion Rate = 0.13 l/day = 50 ml/hour x 2.6 hours/day x 0.001 l/ml.
[2] Surface area assumes lower legs, hands, and feet are exposed.
[3] PCevent is calculated in the Dermal Guidance See Table C-35.

USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters";
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DA_{event} \times EV \times EF \times SAsw/adj}{AT \times 365 \text{ days/yr}}$$

Where:

SAsw/adj = Sum (SA x ED / BW)

$DA_{event} = PC_{event} \times CW \times CF1 \times CF2$

Note: For noncarcinogenic effects, AT = ED.

TABLE G34

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
CHILD RESIDENT - WADING
SITE 16
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF	CANCER RISK INGESTION	PCEVENT [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2]	CANCER RISK DERMAL	TOTAL CANCER RISK
Beryllium	0.21	ug/L	4.3E-08	4.3E+00	1.8E-07	0.0026	1.6E-09	4.3E+02	7.0E-07	**8.9E-07**
			SUMMARY CANCER RISK		**2E-07**				**7E-07**	**9E-07**

[1] This chemical-specific value has been calculated in Table C-35.
[2] Calculated from oral CSFs.
ND = no data available.

TABLE : 634

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
CHILD RESIDENT - WADING
SITE 16
MILTON, FLORIDA

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCEVENT [1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Beryllium	0.21	ug/L	5.0E-07	5.0E-03	1.0E-04	0.0026	1.9E-08	5.0E-05	3.8E-04	4.8E-04
				SUMMARY HAZARD INDEX	1E-04				4E-04	5E-04

[1] This chemical-specific value has been calculated in Table C-35.
[2] Calculated from oral RfDs.
ND = no data available.

TABLE G35

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1996
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	0.2	mg/cm^2-event	USEPA, 1992
ABSORPTION FRACTION	ABS_d	chemical specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,000	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical specific	mg/cm^2-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
	CF	1.00E-09	kg/ug	Organic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	45	days/year [1]	USEPA, 1992
EXPOSURE DURATION	ED	7	years	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	7	years	USEPA, 1992

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

USEPA, 1996. Exposure Factors Handbook, 1996.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = \frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$DA_{event} = AF \times ABS_d \times CF$

Note: For noncarcinogenic effects: AT = ED

TABLE G35

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene [1]	O	35	ug/kg	3.1E-10	7.3E+00	2.3E-09	0.01	6.2E-11	8.0E+00	4.9E-10	2.7E-09
Benzo(a)pyrene	O	370	ug/kg	3.3E-09	7.3E+00	2.4E-08	0.01	6.5E-10	8.0E+00	5.2E-09	2.9E-08
Benzo(b)fluoranthene [1]	O	41	ug/kg	3.6E-10	7.3E+00	2.6E-09	0.01	7.2E-11	8.0E+00	5.8E-10	3.2E-09
Benzo(k)fluoranthene [1]	O	3.9	ug/kg	3.4E-11	7.3E+00	2.5E-10	0.01	6.9E-12	8.0E+00	5.5E-11	3.1E-10
Carbazole	O	97	ug/kg	8.5E-10	2.0E-02	1.7E-11	0.01	1.7E-10	4.0E-02	6.8E-12	2.4E-11
Chrysene [1]	O	0.39	ug/kg	3.4E-12	7.3E+00	2.5E-11	0.01	6.9E-13	8.0E+00	5.5E-12	3.1E-11
Dibenz(a,h)anthracene [1]	O	240	ug/kg	2.1E-09	7.3E+00	1.5E-08	0.01	4.2E-10	2.0E+01	8.5E-09	2.4E-08
Indeno(1,2,3-cd)pyrene [1]	O	32	ug/kg	2.8E-10	7.3E+00	2.1E-09	0.01	5.6E-11	8.0E+00	4.5E-10	2.5E-09
Dieldrin	O	32	ug/kg	2.8E-10	1.6E+01	4.5E-09	0.01	5.6E-11	3.2E+01	1.8E-09	6.3E-09
Arsenic	I	3.8	mg/kg	3.3E-08	1.5E+00	5.0E-08	0.001	6.7E-10	1.5E+00	1.0E-09	5.1E-08
Lead	I	473	mg/kg	4.2E-06	ND		0.001	8.3E-08	ND		
SUMMARY CANCER RISK						**1E-07**				**2E-08**	**1E-07**

[1] Carcinogenic PAH concentrations are adjusted by their respective toxicity equivalent factors (USEPA, 1995).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

TABLE 6-35

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	3.1E-08	ND		0.01	6.2E-09	ND		
Benzo(a)pyrene	O	370	ug/kg	3.3E-08	ND		0.01	6.5E-09	ND		
Benzo(b)fluoranthene	O	410	ug/kg	3.6E-08	ND		0.01	7.2E-09	ND		
Benzo(k)fluoranthene	O	390	ug/kg	3 4E-08	ND		0.01	6.9E-09	ND		
Carbazole	O	97	ug/kg	8.5E-09	ND		0.01	1.7E-09	ND		
Chrysene	O	390	ug/kg	3.4E-08	ND		0.01	6.9E-09	ND		
Dibenz(a,h)anthracene	O	240	ug/kg	2.1E-08	ND		0.01	4.2E-09	ND		
Indeno(1,2,3-cd)pyrene	O	320	ug/kg	2.8E-08	ND		0.01	5.6E-09	ND		
Dieldrin	O	32	ug/kg	2.8E-09	5.0E-05	5.6E-05	0.01	5.6E-10	2.5E-05	2.3E-05	7.9E-05
Aluminum	I	11300	mg/kg	1.0E-03	1.0E+00	1.0E-03	0 001	2.0E-05	2.0E-01	1.0E-04	1 1E-03
Arsenic	I	3.8	mg/kg	3 3E-07	3.0E-04	1.1E-03	0 001	6.7E-09	2.9E-04	2.3E-05	1.1E 03
Cadmium	I	2.1	mg/kg	1 8E-07	1.0E-03	1.8E-04	0.001	3.7E-09	1.0E-05	3.7E-04	5.5E-04
Iron	I	13900	mg/kg	1.2E-03	3.0E-01	4.1E-03	0.001	2.4E-05	6.0E-03	4.1E-03	8.2E-03
Lead	I	473	mg/kg	4.2E-05	ND		0 001	8.3E-07	ND		
Manganese	I	296	mg/kg	2.6E-05	4.7E-02	5.5E-04	0.001	5.2E-07	1.9E-03	2.7E-04	8.3E-04
SUMMARY HAZARD INDEX						0.01				0.005	0.01

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0 1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE 6-36

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1996
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	0.2	mg/cm²-event	USEPA, 1992
AGE-SPECIFIC SURFACE AREA	SA_i	age-specific	cm²	USEPA, 1989
ABSORPTION FRACTION	ABS_d	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
	CF	1.00E-09	kg/mg	Organic conversion
BODY WEIGHT	BW	45	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW_i	age specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	45	days/year [1]	USEPA, 1996
EXPOSURE DURATION	ED	2	years	USEPA, 1992
AGE-SPECIFIC EXPOSURE DURATION	ED_i	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	$SA_{soil/adj}$	821	cm²-year/kg	GIR - Table C-5.5; USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	2	years	USEPA, 1992

[1] Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.
[2] In estimating the dermally absorbed dose for children age 7 through 16, the time-weighted, bodyweight normalized surface area exposed is

USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.
USEPA, 1991. *Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.*
USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.
USEPA, 1996. Exposure Factors Handbook 1996.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)[1]

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = AT \times 365\ days/year) \times SA_{soil/adj}$$

Where:

$$SA_{soil/adj} = SUM (SA_i \times ED_i / BW_i)$$

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Note: For noncarcinogenic effects: AT = ED.

TABLE G36

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene [1]	O	35	ug/kg	1.4E-10	7.3E+00	1.0E-09	0.01	1.0E-10	8.0E+00	8.1E-10	1.8E-09
Benzo(a)pyrene	O	370	ug/kg	1.4E-09	7.3E+00	1.1E-08	0.01	1.1E-09	8.0E+00	8.6E-09	1.9E-08
Benzo(b)fluoranthene [1]	O	41	ug/kg	1.6E-10	7.3E+00	1.2E-09	0.01	1.2E-10	8.0E+00	9.5E-10	2.1E-09
Benzo(k)fluoranthene [1]	O	3.9	ug/kg	1.5E-11	7.3E+00	1.1E-10	0.01	1.1E-11	8.0E+00	9.0E-11	2.0E-10
Carbazole	O	97	ug/kg	3.8E-10	2.0E-02	7.6E-12	0.01	2.8E-10	4.0E-02	1.1E-11	1.9E-11
Chrysene [1]	O	0.39	ug/kg	1.5E-12	7.3E+00	1.1E-11	0.01	1.1E-12	8.0E+00	9.0E-12	2.0E-11
Dibenz(a,h)anthracene [1]	O	240	ug/kg	9.4E-10	7.3E+00	6.9E-09	0.01	6.9E-10	8.0E+00	5.6E-09	1.2E-08
Indeno(1,2,3-cd)pyrene [1]	O	32	ug/kg	1.3E-10	7.3E+00	9.1E-10	0.01	9.3E-11	8.0E+00	7.4E-10	1.7E-09
Dieldrin	O	32	ug/kg	1.3E-10	1.6E+01	2.0E-09	0.01	9.3E-11	3.2E+01	3.0E-09	5.0E-09
Arsenic	I	3.8	mg/kg	1.5E-08	1.5E+00	2.2E-08	0.001	1.1E-09	1.5E+00	1.6E-09	2.4E-08
Lead	I	473	mg/kg	1.9E-06	ND		0.001	1.4E-07	ND		
				SUMMARY CANCER RISK		4E-08				2E-08	7E-08

[1] Carcinogenic PAH concentrations are adjusted by their respective toxicity equivalent factors (USEPA, 1995).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

TABLE 336

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	4.8E-08	ND		0.01	3.5E-08	ND		
Benzo(a)pyrene	O	370	ug/kg	5.1E-08	ND		0.01	3.7E-08	ND		
Benzo(b)fluoranthene	O	410	ug/kg	5.6E-08	ND		0.01	4.1E-08	ND		
Benzo(k)fluoranthene	O	390	ug/kg	5.3E-08	ND		0.01	3.9E-08	ND		
Carbazole	O	97	ug/kg	1.3E-08	ND		0.01	9.8E-09	ND		
Chrysene	O	390	ug/kg	5.3E-08	ND		0.01	3.9E-08	ND		
Dibenz(a,h)anthracene	O	240	ug/kg	3.3E-08	ND		0.01	2.4E-08	ND		
Indeno(1,2,3-cd)pyrene	O	320	ug/kg	4.4E-08	ND		0.01	3.2E-08	ND		
Dieldrin	O	32	ug/kg	4.4E-09	5.0E-05	8.8E-05	0.01	3.2E-09	2.5E-05	1.3E-04	2.2E-04
Aluminum	I	11300	mg/kg	1.5E-03	1.0E+00	1.5E-03	0.001	1.1E-04	2.0E-01	5.7E-04	2.1E-03
Arsenic	I	3.8	mg/kg	5.2E-07	3.0E-04	1.7E-03	0.001	3.8E-08	2.9E-04	1.3E-04	1.9E-03
Cadmium	I	2.1	mg/kg	2.9E-07	1.0E-03	2.9E-04	0.001	2.1E-08	1.0E-05	2.1E-03	2.4E-03
Iron	I	13900	mg/kg	1.9E-03	3.0E-01	6.3E-03	0.001	1.4E-04	6.0E-03	2.3E-02	3.0E-02
Lead	I	473	mg/kg	6.5E-05	ND		0.001	4.8E-06	ND		
Manganese	I	296	mg/kg	4.1E-05	4.7E-02	8.6E-04	0.001	3.0E-06	1.9E-03	1.6E-03	2.4E-03
SUMMARY HAZARD INDEX						0.01				0.03	0.04

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995)
[2] Calculated from oral RfDs.

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TABLE G37

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1996
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	0.2	mg/cm^2-event	USEPA, 1992
ABSORPTION FRACTION	ABS_d	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,000	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	350	days/year [1]	USEPA, 1992
EXPOSURE DURATION	ED	7	years	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	7	years	USEPA, 1992

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.
USEPA, 1996. Exposure Factors Handbook, 1996.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Note: **For noncarcinogenic effects, AT = ED.**

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1/5/99

TABLE 637

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg-day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg-day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene [1]	O	35	ug/kg	2.4E-09	7.3E+00	1.8E-08	0.01	4.8E-10	8.0E+00	3.8E-09	2.1E-08
Benzo(a)pyrene	O	370	ug/kg	2.5E-08	7.3E+00	1.9E-07	0.01	5.1E-09	8.0E+00	4.1E-08	2.3E-07
Benzo(b)fluoranthene [1]	O	41	ug/kg	2 8E-09	7.3E+00	2.1E-08	0.01	5.6E-10	8.0E+00	4.5E-09	2.5E-08
Benzo(k)fluoranthene [1]	O	3.9	ug/kg	2.7E-10	7.3E+00	2.0E-09	0.01	5.3E-11	8.0E+00	4.3E-10	2.4E-09
Carbazole	O	97	ug/kg	6.6E-09	2.0E-02	1.3E-10	0.01	1.3E-09	4.0E-02	5.3E-11	1.9E-10
Chrysene [1]	O	0.39	ug/kg	2.7E-11	7.3E+00	2.0E-10	0.01	5.3E-12	8.0E+00	4.3E-11	2.4E-10
Dibenz(a,h)anthracene [1]	O	240	ug/kg	1.6E-08	7.3E+00	1.2E-07	0.01	3.3E-09	8.0E+00	2.6E-08	1.5E-07
Indeno(1,2,3-cd)pyrene [1]	O	32	ug/kg	2.2E-09	7.3E+00	1.6E-08	0.01	4.4E-10	8.0E+00	3.5E-09	2.0E-08
Dieldrin	O	32	ug/kg	2.2E-09	1.6E+01	3.5E-08	0.01	4.4E-10	3.2E+01	1.4E-08	4.9E-08
Arsenic	I	3.8	mg/kg	2.6E-07	1.5E+00	3.9E-07	0.001	5.2E-09	1.5E+00	7.8E-09	4.0E-07
Lead	I	473	mg/kg	3.2E-05	ND		0.001	6.5E-07	ND		
SUMMARY CANCER RISK						**8E-07**				**1E-07**	**9E-07**

[1] Carcinogenic PAH concentrations are adjusted by their respective toxicity equivalent factors (USEPA, 1995).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

TABLE 637

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	2.4E-07	ND		0.01	4.8E-08	ND		
Benzo(a)pyrene	O	370	ug/kg	2.5E-07	ND		0.01	5.1E-08	ND		
Benzo(b)fluoranthene	O	410	ug/kg	2.8E-07	ND		0.01	5.6E-08	ND		
Benzo(k)fluoranthene	O	390	ug/kg	2.7E-07	ND		0.01	5.3E-08	ND		
Carbazole	O	97	ug/kg	6.6E-08	ND		0.01	1.3E-08	ND		
Chrysene	O	390	ug/kg	2.7E-07	ND		0.01	5.3E-08	ND		
Dibenz(a,h)anthracene	O	240	ug/kg	1.6E-07	ND		0.01	3.3E-08	ND		
Indeno(1,2,3-cd)pyrene	O	320	ug/kg	2.2E-07	ND		0.01	4.4E-08	ND		
Dieldrin	O	32	ug/kg	2.2E-08	5.0E-05	4.4E-04	0.01	4.4E-09	2.5E-05	1.8E-04	6.1E-04
Aluminum	I	11300	mg/kg	7.7E-03	1.0E+00	7.7E-03	0.001	1.5E-04	2.0E-01	7.7E-04	8.5E-03
Arsenic	I	3.8	mg/kg	2.6E-06	3.0E-04	8.7E-03	0.001	5.2E-08	2.9E-04	1.8E-04	8.9E-03
Cadmium	I	2.1	mg/kg	1.4E-06	1.0E-03	1.4E-03	0.001	2.9E-08	1.0E-05	2.9E-03	4.3E-03
Iron	I	13900	mg/kg	9.5E-03	3.0E-01	3.2E-02	0.001	1.9E-04	6.0E-03	3.2E-02	6.3E-02
Lead	I	473	mg/kg	3.2E-04	ND		0.001	6.5E-06	ND		
Manganese	I	296	mg/kg	2.0E-04	4.7E-02	4.3E-03	0.001	4.1E-06	1.9E-03	2.1E-03	6.4E-03
SUMMARY HAZARD INDEX						**0.05**				**0.04**	**0.09**

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November, 1995).
[2] Calculated from oral RfDs.

TABLE G38

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	0.2	mg/cm²-event	USEPA, 1995
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm²	USEPA, 1989
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
BODY WEIGHT	BW	15	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year [1]	USEPA, 1995
EXPOSURE DURATION	ED	2	years	USEPA, 1995
AGE-SPECIFIC EXPOSURE DURATION	ED	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	$SA_{soil/adj}$	766	cm² year/kg	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical specific	mg/cm²-event	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	2	years	USEPA, 1995

[1] Air Force meterological data summary for Eglin AFB (close proximity to Milton) states that there is 0.01 inches of rain for 110 days per year. Exposure frequency assumes half of the rainy days require indoor restriction.
[2] In estimating the dermally absorbed dose for children age 1 through 6, the time weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 6 age periods, age 1 through 6, per USEPA, 1992

USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.
USEPA, 1996. Exposure Factors Handbook; 1996.

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_{\text{-INGESTION}} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_{\text{-DERMAL}} = (DA_{event} \times EF / AT \times 365 \text{ days/year}) \times SA_{soil/adj}$$

Where:

$$SA_{soil/adj} = \text{SUM } (SA \times ED / BW)$$

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: For noncarcinogenic effects, AT = ED.

TABLE G38

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene [1]	O	35	ug/kg	6.4E-09	7.3E+00	4.7E-08	0.01	7.3E-10	8.0E+00	5.9E-09	5.3E-08
Benzo(a)pyrene	O	370	ug/kg	6.8E-08	7.3E+00	4.9E-07	0.01	7.8E-09	8.0E+00	6.2E-08	5.6E-07
Benzo(b)fluoranthene [1]	O	41	ug/kg	7.5E-09	7.3E+00	5.5E-08	0.01	8.6E-10	8.0E+00	6.9E-09	6.2E-08
Benzo(k)fluoranthene [1]	O	3.9	ug/kg	7.1E-10	7.3E+00	5.2E-09	0.01	8.2E-11	8.0E+00	6.5E-10	5.9E-09
Carbazole	O	97	ug/kg	1.8E-08	2.0E-02	3.5E-10	0.01	2.0E-09	4.0E-02	8.1E-11	4.4E-10
Chrysene [1]	O	0.39	ug/kg	7.1E-11	7.3E+00	5.2E-10	0.01	8.2E-12	8.0E+00	6.5E-11	5.9E-10
Dibenz(a,h)anthracene [1]	O	240	ug/kg	4.4E-08	7.3E+00	3.2E-07	0.01	5.0E-09	8.0E+00	4.0E-08	3.6E-07
Indeno(1,2,3-cd)pyrene [1]	O	32	ug/kg	5.8E-09	7.3E+00	4.3E-08	0.01	6.7E-10	8.0E+00	5.4E-09	4.8E-08
Dieldrin	O	32	ug/kg	5.8E-09	1.6E+01	9.4E-08	0.01	6.7E-10	3.2E+01	2.1E-08	1.2E-07
Arsenic	I	3.8	mg/kg	6.9E-07	1.5E+00	1.0E-06	0.001	8.0E-09	1.5E+00	1.2E-08	1.1E-06
Lead	I	473	mg/kg	8.6E-05	ND		0.001	9.9E-07	ND		
				SUMMARY CANCER RISK		**2E-06**				**2E-07**	**2E-06**

[1] Carcinogenic PAH concentrations are adjusted by their respective toxicity equivalent factors (USEPA, 1995).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

TABLE G-38

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	2.2E-06	ND		0.01	2.6E-07	ND		
Benzo(a)pyrene	O	370	ug/kg	2.4E-06	ND		0.01	2.7E-07	ND		
Benzo(b)fluoranthene	O	410	ug/kg	2.6E-06	ND		0.01	3.0E-07	ND		
Benzo(k)fluoranthene	O	390	ug/kg	2.5E-06	ND		0.01	2.9E-07	ND		
Carbazole	O	97	ug/kg	6.2E-07	ND		0.01	7.1E-08	ND		
Chrysene	O	390	ug/kg	2.5E-06	ND		0.01	2.9E-07	ND		
Dibenz(a,h)anthracene	O	240	ug/kg	1.5E-06	ND		0.01	1.8E-07	ND		
Indeno(1,2,3-cd)pyrene	O	320	ug/kg	2.0E-06	ND		0.01	2.4E-07	ND		
Dieldrin	O	32	ug/kg	2.0E-07	5.0E-05	4.1E-03	0.01	2.4E-08	2.5E-05	9.4E-04	5.0E-03
Aluminum	I	11300	mg/kg	7.2E-02	1.0E+00	7.2E-02	0.001	8.3E-04	2.0E-01	4.2E-03	7.6E-02
Arsenic	I	3.8	mg/kg	2.4E-05	3.0E-04	8.1E-02	0.001	2.8E-07	2.9E-04	9.6E-04	8.2E-02
Cadmium	I	2.1	mg/kg	1.3E-05	1.0E-03	1.3E-02	0.001	1.5E-07	1.0E-05	1.5E-02	2.9E-02
Iron	I	13900	mg/kg	8.9E-02	3.0E-01	3.0E-01	0.001	1.0E-03	6.0E-03	1.7E-01	4.7E-01
Lead	I	473	mg/kg	3.0E-03	ND		0.001	3.5E-05	ND		
Manganese	I	296	mg/kg	1.9E-03	4.7E-02	4.0E-02	0.001	2.2E-05	1.9E-03	1.1E-02	5.2E-02
				SUMMARY HAZARD INDEX		0.51				0.20	0.71

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

Harding Lawson Associates
Ss16avg.xls
1/5/99

TABLE G39

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1996
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	0.2	mg/cm^2-event	USEPA, 1992
ABSORPTION FRACTION	ABS	chemical-specific	unitless	Assumption
SURFACE AREA EXPOSED	SA	2,000	cm^2	USEPA, 1996
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	250	days/year [1]	USEPA, 1992
EXPOSURE DURATION	ED	9	years	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	9	years	USEPA, 1992

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors";

USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

USEPA, 1996. Exposure Factors Handbook, 1996.

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_{\text{INGESTION}} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_{\text{DERMAL}} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: **For noncarcinogenic effects, AT = ED**

TABLE G39

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene [1]	O	35	ug/kg	2.2E-09	7.3E+00	1.6E-08	0.01	1.8E-10	8.0E+00	1.4E-09	1.7E-08
Benzo(a)pyrene	O	370	ug/kg	2.3E-08	7.3E+00	1.7E-07	0.01	1.9E-09	8.0E+00	1.5E-08	1.8E-07
Benzo(b)fluoranthene [1]	O	41	ug/kg	2.6E-09	7.3E+00	1.9E-08	0.01	2.1E-10	8.0E+00	1.7E-09	2.0E-08
Benzo(k)fluoranthene [1]	O	3.9	ug/kg	2.5E-10	7.3E+00	1.8E-09	0.01	2.0E-11	8.0E+00	1.6E-10	1.9E-09
Carbazole	O	97	ug/kg	6.1E-09	2.0E-02	1.2E-10	0.01	4.9E-10	4.0E-02	2.0E-11	1.4E-10
Chrysene [1]	O	0.39	ug/kg	2.5E-11	7.3E+00	1.8E-10	0.01	2.0E-12	8.0E+00	1.6E-11	1.9E-10
Dibenz(a,h)anthracene [1]	O	240	ug/kg	1.5E-08	7.3E+00	1.1E-07	0.01	1.2E-09	8.0E+00	9.7E-09	1.2E-07
Indeno(1,2,3-cd)pyrene [1]	O	32	ug/kg	2.0E-09	7.3E+00	1.5E-08	0.01	1.6E-10	8.0E+00	1.3E-09	1.6E-08
Dieldrin	O	32	ug/kg	2.0E-09	1.6E+01	3.2E-08	0.01	1.6E-10	3.2E+01	5.2E-09	3.7E-08
Arsenic	I	3.8	mg/kg	2.4E-07	1.5E+00	3.6E-07	0.001	1.9E-09	1.5E+00	2.9E-09	3.6E-07
Lead	I	473	mg/kg	3.0E-05	ND		0.001	2.4E-07	ND		
SUMMARY CANCER RISK						7E-07				4E-08	8E-07

[1] Carcinogenic PAH concentrations are adjusted by their respective toxicity equivalent factors (USEPA, 1995).
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

TABLE 6-39

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 16

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Benzo(a)anthracene	O	350	ug/kg	1.7E-07	ND		0.01	1.4E-08	ND		
Benzo(a)pyrene	O	370	ug/kg	1.8E-07	ND		0.01	1.4E-08	ND		
Benzo(b)fluoranthene	O	410	ug/kg	2.0E-07	ND		0.01	1.6E-08	ND		
Benzo(k)fluoranthene	O	390	ug/kg	1.9E-07	ND		0.01	1.5E-08	ND		
Carbazole	O	97	ug/kg	4.7E-08	ND		0.01	3.8E-09	ND		
Chrysene	O	390	ug/kg	1.9E-07	ND		0.01	1.5E-08	ND		
Dibenz(a,h)anthracene	O	240	ug/kg	1.2E-07	ND		0.01	9.4E-09	ND		
Indeno(1,2,3-cd)pyrene	O	320	ug/kg	1.6E-07	ND		0.01	1.3E-08	ND		
Dieldrin	O	32	ug/kg	1.6E-08	5.0E-05	3.1E-04	0.01	1.3E-09	2.5E-05	5.0E-05	3.6E-04
Aluminum	I	11300	mg/kg	5.5E-03	1.0E+00	5.5E-03	0.001	4.4E-05	2.0E-01	2.2E-04	5.7E-03
Arsenic	I	3.8	mg/kg	1.9E-06	3.0E-04	6.2E-03	0.001	1.5E-08	2.9E-04	5.1E-05	6.2E-03
Cadmium	I	2.1	mg/kg	1.0E-06	1.0E-03	1.0E-03	0.001	8.2E-09	1.0E-05	8.2E-04	1.8E-03
Iron	I	13900	mg/kg	6.8E-03	3.0E-01	2.3E-02	0.001	5.4E-05	6.0E-03	9.1E-03	3.2E-02
Lead	I	473	mg/kg	2.3E-04	ND		0.001	1.9E-06	ND		
Manganese	I	296	mg/kg	1.4E-04	4.7E-02	3.1E-03	0.001	1.2E-06	1.9E-03	6.1E-04	3.7E-03
SUMMARY HAZARD INDEX						0.04				0.01	0.05

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE G-40

CONCENTRATION OF VOCs WHILE SHOWERING
ADULT RESIDENT
SITE 16
MILTON, FLORDIA

EMPIRICAL CONSTANTS

CONSTANT	SYMBOL	VALUE	UNIT	SOURCE
Liquid-film mass transfer for CO_2	K_l (CO_2)	20	cm/hr	Calculated
Gas-film mass transfer for water	K_g (H_2O)	3000	cm/hr	Calculated
Molar gas constant x Temperature	RT	0.024	atm-m^3/mole	
Reference temperature	T_l	293	K	
Temperature of shower water	T_s	318	K	Assumption
Viscosity of water at shower temperature	u_s	0.6178	cp	Calculated
Viscosity of water at reference temperature	u_l	0.65	cp	Calculated
Shower droplet free-fall time	t_s	1.5	sec	Assumption
Droplet diameter	d	1	mm	Foster & Chrostowski, 1987
Flow rate in shower	FR	20	l/min	Assumption
Volume of shower area	SV	12	m^3	Assumption
Air exchange rate	R	0.03	min^{-1}	Calculated
Time in shower	D_s	12	min	USEPA, 1989
Time at which concentration is being calculated	t	12	min	Assumption

Foster, S.A. and Chrostowski, P.C., 1987. Inhalation Exposures to Volatile Organic Contaminants in the Shower.
USEPA, 1989, Exposure Factors Handbook; EPA/600/8-89/043, May 1989.
All equations and definitions of terms are presented in the Appendix to this report, Calculation of Air Concentration Using the Shower Model.

TABLE G40

CONCENTRATION OF VOCs WHILE SHOWERING
ADULT RESIDENT
SITE 16
MILTON, FLORDIA
INTERIM CORRECTIVE MEASURE

SHOWER CONCENTRATIONS

COMPOUND	C_w (ug/l)	MW (g/mol)	H (atm-m³/mol)	k_l (cm/hr)	k_g (cm/hr)	K_L (cm/hr)	K_{al} (cm/hr)	C_{wd} (µg/l)	S (µg/m³-min)	$C_{(voc)}$ (µg/m³)
1,2-Dichloroethane	9.9	99.0	0.00098	1.3E+01	1.3E+03	1.1E+01	1.1E+01	2.4E+00	4.1E+00	**4.1E+01**
1,2-Dichloroethene (total)	9.1	97.0	0.00758	1.3E+01	1.3E+03	1.3E+01	1.4E+01	2.7E+00	4.5E+00	**4.5E+01**
Benzene	180	78.0	0.0056	1.5E+01	1.4E+03	1.4E+01	1.5E+01	5.7E+01	9.6E+01	**9.6E+02**
Chloroform	1	120.0	0.0037	1.2E+01	1.2E+03	1.1E+01	1.2E+01	2.6E-01	4.4E-01	**4.4E+00**
Trichloroethene	5.5	130.0	0.01	1.2E+01	1.1E+03	1.1E+01	1.2E+01	1.4E+00	2.4E+00	**2.4E+01**

C_w = Concentration in groundwater

MW = Molecular weight

H = Henry's Law constant

k_l = Chemical-specific mass-transfer coefficient

k_g = Chemical-specific gas mass-transfer coefficient

K_L = Mass transfer coefficient

K_{al} = Temperature correction of mass transfer coefficient

C_{wd} = Analyte concentration in water droplet

S = Release rate of analyte to air

$C_{(voc)}$ = Analyte concentration in bathroom air at time t.

$$C_{(voc)} = (S/R) \times (e^{(RDs)}-1) \times e^{(-Rt)}$$

Harding Lawson Associates
Gwavg.xls
1/5/99

TABLE G41

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES) (CENTRAL TENDENCY)
ADULT RESIDENT
SITE 16
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE	IR	1.4	liters/day	USEPA, 1992
BODY WEIGHT	BW	70	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1992
EXPOSURE DURATION	ED	7	years	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	7	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CW \times IR \times EF \times ED \times CF}{BW \times AT \times 365 \text{ days/year}}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE G41

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES) (CENTRAL TENDENCY)
ADULT RESIDENT
SITE 16
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK INGESTION
1,2-Dichlorethane	9.9	UG/LITER	1.9E-05	9.1E-02	1.7E-06
Benzene	180	UG/LITER	3.5E-04	2.9E-02	1.0E-05
Chloroform	1	UG/LITER	1.9E-06	6.1E-03	1.2E-08
Trichlorethene	5.5	UG/LITER	1.1E-05	1.1E-02	1.2E-07
4,4-DDT	0.06	UG/LITER	1.2E-07	3.4E-01	3.9E-08
bis(2-Ethylhexyl)phthalate	6.9	UG/LITER	1.3E-05	1.4E-02	1.9E-07
Arsenic	3.3	UG/LITER	6.3E-06	1.5E+00	9.5E-06
			TOTAL CANCER RISK		2E-05

TABLE G41

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES) (CENTRAL TENDENCY)
ADULT RESIDENT
SITE 16
MILTON, FLORIDA

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
1,2-Dichloroethane	9.9	UG/LITER	1.9E-04	3.0E-01	6.3E-04
1,2-Dichloroethene	9.1	UG/LITER	1.7E-04	9.0E-03	1.9E-02
Benzene	180	UG/LITER	3.5E-03	3.0E-04	1.2E+01
Chloroform	1	UG/LITER	1.9E-05	1.0E-02	1.9E-03
Trichloroethene	5.5	UG/LITER	1.1E-04	6.0E-03	1.8E-02
bis(2-Ethylhexyl)phthalate	6.9	UG/LITER	1.3E-04	2.0E-02	6.6E-03
4,4-DDT	0.06	UG/LITER	1.2E-06	5.0E-04	2.3E-03
Aluminum	491	UG/LITER	9.4E 03	1.0E+00	9.4E-03
Arsenic	3.3	UG/LITER	6.3E-05	3.0E-04	2.1E-01
Barium	53.9	UG/LITER	1.0E-03	7.0E-02	1.5E-02
Cadmium	2.6	UG/LITER	5.0E-05	5.0E-04	1.0E-01
Iron	4570	UG/LITER	8.8E-02	3.0E-01	2.9E-01
Manganese	188	UG/LITER	3.6E-03	4.7E-02	7.7E-02
			TOTAL HAZARD INDEX		12
ND = no data available.					

TABLE G42

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES) (CENTRAL TENDENCY)
CHILD RESIDENT
SITE 16
MILTON, FLORDIA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE	IR	0.7	liters/day	USEPA, 1992
BODY WEIGHT	BW	15	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1992
EXPOSURE DURATION	ED	2	years	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	2	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CW \times IR \times EF \times ED \times CF}{BW \times AT \times 365\ \text{days/year}}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE G42

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES) (CENTRAL TENDENCY)
CHILD RESIDENT
SITE 16
MILTON, FLORDIA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK INGESTION
1,2-Dichlorethane	9.9	UG/LITER	1.3E-05	9.1E-02	1.2E-06
Benzene	180	UG/LITER	2.3E-04	2.9E-02	6.7E-06
Chloroform	1	UG/LITER	1.3E-06	6.1E-03	7.8E-09
Trichlorethene	5.5	UG/LITER	7.0E-06	1.1E-02	7.7E-08
4,4-DDT	0.06	UG/LITER	7.7E-08	3.4E-01	2.6E-08
bis(2-Ethylhexyl)phthalate	6.9	UG/LITER	8.8E-06	1.4E-02	1.2E-07
Arsenic	3.3	UG/LITER	4.2E-06	1.5E+00	6.3E-06
			TOTAL CANCER RISK		1E-05

TABLE G42

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES) (CENTRAL TENDENCY)
CHILD RESIDENT
SITE 16
MILTON, FLORDIA

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
1,2-Dichloroethane	9.9	UG/LITER	4.4E-04	3.0E-01	1.5E-03
1,2-Dichloroethene	9.1	UG/LITER	4.1E-04	9.0E-03	4.5E-02
Benzene	180	UG/LITER	8.1E-03	3.0E-04	2.7E+01
Chloroform	1	UG/LITER	4.5E-05	1.0E-02	4.5E-03
Trichloroethene	5.5	UG/LITER	2.5E-04	6.0E-03	4.1E-02
bis(2-Ethylhexyl)phthalate	6.9	UG/LITER	3.1E-04	2.0E-02	1.5E-02
4,4-DDT	0.06	UG/LITER	2.7E-06	5.0E-04	5.4E-03
Aluminum	491	UG/LITER	2.2E-02	1.0E+00	2.2E-02
Arsenic	3.3	UG/LITER	1.5E-04	3.0E-04	4.9E-01
Barium	53.9	UG/LITER	2.4E-03	7.0E-02	3.4E-02
Cadmium	2.6	UG/LITER	1.2E-04	5.0E-04	2.3E-01
Iron	4570	UG/LITER	2.0E-01	3.0E-01	6.8E-01
Manganese	188	UG/LITER	8.4E-03	4.7E-02	1.8E-01
			TOTAL HAZARD INDEX		29

TABLE G43

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER (CENTRAL TENDENCY)
ADULT RESIDENT - WADING
SITE 16
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical specific	ug/liter	
INGESTION RATE [1]	IR	0.026	liters/day	USEPA, 1995
SURFACE AREA [2]	SA	5,750	cm2	USEPA, 1989
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	70	kg	USEPA, 1991
DOSE ABSORBED PER EVENT	DAevent	chemical-specific	mg/cm2-event	Calculated
EXPOSURE TIME	ET	2.6	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	7	years	USEPA, 1992a
DIFFUSION DEPTH PER EVENT	PCevent	chemical-specific	cm/event	Calculated per USEPA, 1992b [3]
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	7	years	USEPA, 1995
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm3	

[1] Ingestion Rate = 0.026 l/day = 10 ml/hour x 2.6 hours/day x 0.001 l/ml
[2] Surface area assumes lower legs, hands, and feet are exposed.
[3] PCevent is calculated in the Dermal Guidance See Table C-35.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters."
USEPA, 1992a. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.
USEPA, 1992b. Dermal Exposure Assessment: Principles and Applications, EPA/600/8-91/011B.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DAevent \times EV \times EF \times ED \times SA}{AT \times BW \times 365\ \text{days/yr}}$$

Where:
DAevent = PCevent x CW x CF1 x CF2

Note: *For noncarcinogenic effects, AT = ED.*

TABLE 6-43

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER (CENTRAL TENDENCY)
ADULT RESIDENT - WADING
SITE 16
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)^-1	CANCER RISK INGESTION	PCEVENT[1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Beryllium	0.21	ug/L	9.6E-10	4.3E+00	4.1E-09	0.0026	5.5E-10	4.3E+02	2.4E-07	**2.4E-07**
SUMMARY CANCER RISK					**4E-09**				**2E-07**	**2E-07**

[1] This chemical-specific value has been calculated in Table C-35.

[2] Calculated from oral CSFs.
ND = no data available.

TABLE G-43

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER (CENTRAL TENDENCY)
ADULT RESIDENT - WADING
SITE 16
MILTON, FLORIDA

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCEVENT[1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)^-1	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Beryllium	0.21	ug/L	9.6E-09	5.0E-03	1.9E-06	0.0026	5.5E-09	5.0E-05	1.1E-04	1.1E-04
SUMMARY HAZARD INDEX					2E-06				1E-04	1E-04

[1] This chemical-specific value has been calculated in Table C-35.
[2] Calculated from oral RfDs.
ND = no data available.

TABLE G 44

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER (CENTRAL TENDENCY)
CHILD RESIDENT - WADING
SITE 16
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE [1]	IR	0.13	liters/day	USEPA, 1995
AGE-SPECIFIC SURFACE AREA [2]	SA	age-specific	cm^2	USEPA, 1989
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	15	kg	USEPA, 1991
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	Calculated
EXPOSURE FREQUENCY	EF	100	days/year	Assumption
EXPOSURE DURATION	ED	2	years	USEPA, 1992a
AGE-WEIGHTED SURFACE AREA [3]	SAsw/adj	766	cm^2-yr/kg	Calculated per USEPA, 1992b
DIFFUSION DEPTH PER EVENT [4]	PC_{event}	chemical-specific	cm/event	Calculated per USEPA, 1992b
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	2	years	USEPA, 1992a
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm^3	

[1] Ingestion Rate = 0.13 l/day = 50 ml/hour x 2.6 hours/day x 0.001 l/ml
[2] Surface area assumes lower legs, hands, and feet are exposed.
[3] PCevent is calculated in the Dermal Guidance See Table C-35.

USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters";
USEPA, 1992a. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.
USEPA, 1992b. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DA_{event} \times EV \times EF \times SAsw/adj}{AT \times 365\ \text{days/yr}}$$

Where:

SAsw/adj = Sum (SA x ED / BW)

$DA_{event} = PC_{event} \times CW \times CF1 \times CF2$

Note: For noncarcinogenic effects, AT = ED.

TABLE G44

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER (CENTRAL TENDENCY)
CHILD RESIDENT - WADING
SITE 16
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF	CANCER RISK INGESTION	PCEVENT [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2]	CANCER RISK DERMAL	TOTAL CANCER RISK
Beryllium	0.21	ug/L	1.4E-08	4.3E+00	6.1E-08	0.0026	1.6E-09	4.3E+02	7.0E-07	7.7E-07
			SUMMARY CANCER RISK		6E-08				7E-07	8E-07

[1] This chemical-specific value has been calculated in Table C-35.

ND = no data available.

TABLE G44

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER (CENTRAL TENDENCY)
CHILD RESIDENT - WADING
SITE 16
MILTON, FLORIDA

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCEVENT [1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Beryllium	0.21	ug/L	5.0E-07	5.0E-03	1.0E-04	0.0026	5.7E-08	5.0E-05	1.1E-03	1.2E-03
SUMMARY HAZARD INDEX					1E-04				1E-03	1E-03

[1] This chemical-specific value has been calculated in Table C-35.
[2] Calculated from oral RfDs.
ND = no data available.

HUMAN HEALTH TOXICITY PROFILES

1,4-Dichlorobenzene. 1,4-Dichlorobenzene has been used as mothballs, an insecticidal fumigant, a germicide, and a space deodorant. Human exposure to 1,4-dichlorobenzene has produced irritation to skin, throat, and eyes; prolonged exposure to high concentrations may cause weakness, dizziness, loss of weight, or liver injury. In several studies involving female rats and mice, no overt signs of toxicity were apparent at any exposure level. Non-tumor and tumor pathology did not indicate any treatment related effect of either species. An embryotoxicity and teratology study on rats did not demonstrate any signs of embryo- or phytotoxicity or teratogenicity at any exposure level (Loeser, 1983). In a series of mutagenicity tests, 1,4-dichlorobenzene did not produce a mutagenic response. (Loeser, 1983). Other exposure studies in rats have produced developmental abnormalities, phytotoxicity, and kidney tumors. Additional exposure studies in animals have produced histological changes in the lung, cirrhosis and necrosis of the liver, swelling of the tubular epithelium of the kidneys. 1,4-dichlorobenzene has been classified by the USEPA as a group C carcinogen, possibly carcinogenic to humans.

References:

Health Effects Summary Tables (HEAST), 1993. United States Environmental Protection Agency.

Loeser E, Litchfield MH; Food Chem Toxicol 21 (6): 825-32 (1983)

1,1-Dichloroethene. 1,1-Dichloroethene is a man-made chlorinated solvent that is used to make polyvinylidene chloride copolymers, which are used as flexible films for packaging all types of materials, including food.

Data on 1,1-dichloroethene exposure in humans are limited. However, available evidence suggests that 1,1-dichloroethene causes central nervous system depression and liver toxicity in humans. Toxicity data on laboratory animals confirm this evidence, and also indicate that 1,1-dichloroethene may produce adverse effects on the kidney, heart, and lung. Pharmacokinetic data from laboratory animals suggest that 1,1-dichloroethene is metabolized to toxic metabolites, and that these metabolites are responsible for the adverse effects. Therefore, organs with high biotransformation enzyme activity, such as the liver, kidney, and lungs, are likely to be adversely impacted. Limited evidence in animals suggests that 1,1-dichloroethene may be carcinogenic. Therefore, the USEPA has placed 1,1-dichloroethene in weight-of-evidence group C, possible human carcinogen.

References:

MADEP, 1992. "Risk Assessment Shortform Residential Exposure Scenario, Version 1.6"; Policy #WSC/ORS-142-92: Office of Research and Standards and the Bureau of Waste Site Cleanup, Boston, MA; September 1992.

Agency for Toxic Substances and Disease Registry (ATSDR), 1992. "Toxicological Profile for 1,1-Dichloroethene"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, October 1992.

1,2-Dichloroethene. 1,2-Dichloroethene is a volatile organic compound which exists as cis- and trans-isomers. The commercially used material is usually a mixture of the two isomers. In the past, it was used as a general inhalation anesthetic. It is used most often as a solvent for dyes, perfume oils, waxes, resins, and plastics. It is also used as an intermediate in the synthesis of polymers.

1,2-Dichloroethene is absorbed by all routes of administration. Distribution is rapid and, due to its lipophilic nature, occurs to all organ systems. It is extensively metabolized to dichloroacetaldehyde and chloroacetic acids which are excreted primarily through urine.

Dermal contact to 1,2-dichloroethene may result in defatting of the skin and dermatitis. Exposure to airborne 1,2-dichloroethene causes irritation to eyes, mucous membranes and the upper respiratory tract. Systemically, the trans-isomer is believed to be more toxic than the cis-isomer. However, both have been reported to produce central nervous system depression and toxicity to liver and lungs. No data on the reproductive toxicity of 1,2-dichloroethene exists. Both isomers have tested negative for mutagenicity in vitro tests. Cancer effects have not been studied in humans or animals.

References:

Agency for Toxic Substances and Disease Registry (ATSDR), 1990. "Toxicological Profile for 1,2-Dichloroethene"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, February 1990.

Mycroft, F.J., Jones, J.R., and Olson, K.R. 1990. Environmental and Occupational Toxicology. In: Poisoning and Drug Overdose. Ed. K.R. Olson. Appleton & Lange, CT. p. 397.

Aluminum. Aluminum occurs naturally in the soil and makes up approximately 8 percent of the earths crust. Higher soil concentrations are associated with industries which burn coal and aluminum mining and smelting. Human exposures to aluminum may occur through ingestion of foods grown in soil that contains aluminum and use of antacids, antiperspirants, and other drug store items. Aluminum in antiperspirants can cause skin rashes in some people. Factory workers who inhale large amounts of aluminum dust may develop lung problems. Aluminum has caused lower birth weights in some animals. Studies have shown that aluminum accumulates in the brains of people with Alzheimer's disease. However, any causal link between aluminum exposure and this disease is yet to be demonstrated. Both human epidemiological studies and animal experiments strongly suggests that aluminum is not a carcinogen.

References:

Agency for Toxic Substances and Disease Registry (ATSDR), 1989. "Toxicological Profile for Aluminum"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, October 1989.

Antimony. Antimony enters the environment during the mining and processing of its ores and other related metals. Small amounts of antimony are also released into the environment by incinerators and coal-burning power plants. Antimony will strongly adhere to soil which contains iron, manganese, or aluminum. Antimony was used for medicinal purposes to treat people infected with parasites. However, chronic exposure can cause eye, skin, and lung irritation, as well as heart problems, vomiting and diarrhea. The oral RfD was based on changes in glucose and cholesterol levels in an oral drinking water study in rats. Antimony has not been evaluated by the USEPA for evidence of human carcinogenic potential.

References:

Agency for Toxic Substances and Disease Registry (ATSDR), 1991. "Toxicological Profile for Antimony"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, February 1991.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Arsenic. Arsenic had once used in pesticide formulations and has industrial uses in tanneries, as well as the glass and wine making industries. Toxicity depends on its chemical form. Arsenic is an irritant of the skin, mucous membranes, and gastrointestinal tract. Symptoms of acute toxicity include vomiting, diarrhea, convulsions, and a severe drop in blood pressure. Subchronic effects include hyperpigmentation, sensory-motor polyneuropathy, persistent headache, and lethargy. Chronic oral exposure has caused skin lesions, peripheral vascular disease, and peripheral neuropathy. The USEPA has classified arsenic as Group A, human carcinogen, based on increased incidence of skin and lung cancer in epidemiology studies.

References:

Agency for Toxic Substances and Disease Registry (ATSDR), 1992. "Toxicological Profile for Arsenic"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, February 1992.

Benzene. Benzene is an organic solvent that is found in the environment from both natural processes from petroleum sources. Benzene is used in the synthesis of many industrial chemicals and pharmaceuticals, for the extraction of fats and oils, in the manufacture of explosives, in is a major component of petroleum based fuels such as gasoline.

Benzene is readily absorbed orally, moderately absorbed by inhalation, and poorly absorbed dermally. Its toxic actions are primarily a result of its metabolites, which are largely produced in the liver, and to some extent, in the bone marrow. Acute exposure to benzene has produced central nervous system depression in humans and animals. Chronic exposures have produced adverse liver effects and hematological toxicity, including aplastic anemia and leukemia. Available evidence does not suggest that benzene is teratogenic in humans or animals. There is sufficient evidence of benzene-induced carcinogenicity in humans via inhalation exposure, placing it in USEPA weight-of-evidence group A, human carcinogen.

References:

MADEP, 1992. "Risk Assessment Shortform Residential Exposure Scenario, Version 1.6"; Policy #WSC/ORS-

142-92; Office of Research and Standards and the Bureau of Waste Site Cleanup, Boston, MA; September 1992.

Bis(2-ethylhexyl)phthalate (DEHP). DEHP is used industrially as a plasticizer for resins and is found in many plastic materials as it makes them more flexible. It is also used in manufacturing organic pump fluids in electrical capacitors. Acute exposure to DEHP has produced eye and mucous membrane irritation, nausea, and diarrhea. Chronic exposure of laboratory animals to DEHP indicate that the target organs are the liver, causing morphological and biochemical changes, as well as the testes, producing damage to the seminiferous tubules. DEHP has produced developmental and reproductive effects in laboratory animals including spina bifida and reduced fertility. DEHP has been shown to cause a dose-related increase in liver tumors in mice and rats. Thus, the USEPA has designated DEHP as a B2, probable human carcinogen.

References:

ATSDR, 1991. Toxicological Profile for Di(2-ethylhexyl)phthalate. Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, October, 1991.

Chlorobenzene. Chlorobenzene is used industrially as a solvent and in the manufacture of other chemicals. It is an intermediate in the manufacture of dyestuffs and pesticides. Acute exposures have caused irritation of the eyes, nose, and skin, as well as CNS depression accompanied by drowsiness, numbness, nausea, and vomiting. Evidence from animal studies indicate that exposure via ingestion or inhalation can produce severe kidney and liver effects. The USEPA has classified chlorobenzene in Group D, inadequate evidence of carcinogenicity.

References:

Clayton, George D. and Florence E. Clayton, editors, 1981. Patty's Industrial Hygiene and Toxicology, 3rd Revised Edition; John Wiley & Sons; New York.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

DDT. DDT was one of the most highly used insecticides, and is now ubiquitous in the environment. It was used extensively in World War II to control lice (applied directly to human skin), and later used as an agricultural insecticide and as a public health tool to control insects which spread typhus and malaria. DDD and DDE were contained as impurities in DDT, and are also primary metabolites of DDT, and share similar toxicological properties. DDT, DDD, and DDE are highly persistent in the environment, and thus tend to bioconcentrate in the food chain. This, combined with its toxicological properties, has been attributed to the decline in population of several predatory bird species.

DDT is absorbed to a minor extent via inhalation and dermal routes, and to a large extent by the oral route. Exposure to humans is likely greatest through ingestion of mucous that was contaminated with DDT that had been inhaled. DDT is absorbed into the lymphatic system and distributed to fats throughout the body. In both humans and animals, DDT acts as a CNS stimulant by interfering with the movement of ions within neurons. DDT acts as an estrogenic compound in animals, and this has been attributed to numerous adverse reproductive effects observed in animals exposed to DDT. DDT also causes liver hypertrophy, hepatocyte degeneration, and induces the enzyme cytochrome P450, which can effect the metabolism of other xenobiotics. There is no conclusive evidence of DDT-induced carcinogenicity in humans. However, DDT has produced liver tumors in laboratory animals. DDD, DDE, and DDT have, therefore, been placed in USEPA's weight of evidence group B2, probable human carcinogen.

References:

Agency for Toxic Substances and Disease Registry (ATSDR), 1992. "Toxicological Profile for DDD, DDE, and DDT"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, October 1992.

Iron. Iron is a metal which is required for a variety of physiological functions such as heme biosynthesis, oxidative phosphorylation and mixed-function oxidase-mediated metabolic reactions. Only divalent forms of iron are absorbed. As absorption occurs, divalent iron is biochemically converted to trivalent iron, the biologically active form. Under normal conditions, absorbed dietary iron is complexed to hemoglobin and transported to the liver for storage until needed for physiological reactions. The balance of iron is regulated only by the amount of dietary intake and the degree of intestinal absorption. Intestinal absorption tends to be low (2 - 15%) except during periods of increased iron need when absorption efficiency increases dramatically.

Acute iron toxicity has been well characterized following the accidental ingestion of iron-containing preparations by children. Shortly after ingestion, the corrosive effects of iron cause vomiting and diarrhea, often bloody. Later signs include shock, metabolic acidosis, seizures, liver and/or kidney failure, coma, and death. Chronic iron overload manifests as disturbances in liver function, diabetes mellitus, and endocrine and cardiovascular effects. Inhalation of iron containing dust or fumes in occupational settings may result in deposition of iron particles in the lungs leading to interstitial fibrosis. Autopsies of hematite miners noted an increase in lung cancer. However, the etiology of the lung cancer may be related to factors other than iron exposure such as cigarette, silica or PAH exposures.

References:

Aisen, P., Cohen, G. and Kang, J.O., 1990. Iron Toxicosis. Int. Rev. Exp. Pathol. 31:1-46.

Goyer, R.A., 1991. Toxic Effects of Metals. In: Casarett and Doull's Toxicology: The Basic Science of Poisons, 3rd edition. Eds. C.D. Klaassen, M.O. Amdur and J. Doull. Macmillan Publishing Co. N.Y.

<u>Manganese</u>. Manganese is a naturally-occurring substance found in many types of rock. It does not generally occur in the environment as the pure metal, rather, it is found combined with other chemicals such as sulfur, oxygen, and chlorine. Manganese is mixed with iron to make various types of steel. Manganese is a component of some ceramics, pesticides, fertilizers, and in nutritional supplements. In small doses manganese is beneficial to human health. Manganese miners and steel workers exposed to elevated concentrations of manganese have evidenced mental and emotional disturbances, and slow and clumsy body movements. Target organs of manganese are the lung and CNS. When inhaled, manganese dust can also cause lung irritation. EPA has classified manganese as a Class D, not classifiable as to human carcinogenicity.

References:

Agency for Toxic Substances and Disease Registry (ATSDR), 1991. "Toxicological Profile for Manganese"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, February 1991.

<u>Thallium</u>. Thallium is a naturally-occurring soft metal that is a minor constituent in a variety of ores and is obtained as a by-product of the refining of iron, cadmium, and zinc. It is used as a catalyst, in certain alloys, jewelry, thermometers, semiconductors, dyes and pigments, and optical lenses. It has been used medically as a depilatory agent. Additionally, it is used as a rodenticide and insecticide. Thallium is efficiently absorbed from the gastrointestinal tract. Excretion occurs primarily through urine and feces. Following absorption, distribution occurs to kidney tissue to a large extent, with lesser distribution to thyroid, intestines, testes, pancreas, skin, bone, and spleen.

Thallium is one of the more toxic metals. Acute toxicity results in gastrointestinal irritation, shock, ascending paralysis, seizures, and psychic disturbances. Signs of subacute or chronic thallium poisoning include hair loss, nail dystrophy, cataracts, peripheral muscular weakness and atrophy, chorea, peripheral neuropathy, and kidney damage. Loss of vision have been related to industrial thallium exposures. No information is available which addresses the carcinogenic potential of thallium.

References:

Goyer, R.A., 1991. Toxic Effects of Metals. In: Casarett and Doull's Toxicology: The Basic Science of Poisons, 3rd edition. Eds. C.D. Klaassen, M.O. Amdur and J. Doull. Macmillan Publishing Co. N.Y.

Tweig, M., 1990. Thallium. In: Poisoning and Drug Overdose. Ed. K.R. Olson. Appleton & Lange, CT. pps. 276-7.

<u>Trichloroethene</u>. Trichloroethene is a man-made chlorinated solvent that is used extensively in industry as a metal degreasing agent. Trichloroethene is also used in dry cleaning and as a solvent in paints and adhesives.

Several human deaths and acute neurotoxic effects have been attributed to oral and inhalation exposure to trichloroethene. In animals, oral and inhalation exposure to trichloroethene have produce neurotoxic effects, including behavioral changes, and renal toxicity. Additionally, inhalation and oral exposures to trichloroethene in animals have produced lung, liver, and testicular cancers. Epidemiological data in humans is insufficient to conclude whether trichloroethene is a human carcinogen. However, studies on trichloroethene metabolism suggest that it is metabolized similarly
in humans and laboratory animals. Therefore, the USEPA has placed trichloroethene in weight-of-evidence group B2, probable human carcinogen.

References:

MADEP, 1992. "Risk Assessment Shortform Residential Exposure Scenario, Version 1.6"; Policy #WSC/ORS-142-92; Office of Research and Standards and the Bureau of Waste Site Cleanup, Boston, MA; September 1992.

APPENDIX H

ECOLOGICAL RISK DATA

Table H - 1
Summary of Bioaccumulation Data

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Site 16
Naval Air Station Whiting Field
Milton, Florida

Analyte	Bioaccumulation Factor [a]									
	Log K_{ow}		[b]	Invertebrate [c]		Plant [d]		Mammal [e]		Bird [f]
SEMIVOLATILES										
Benzo(a)anthracene	5.7		5.8	5.0E-02		3.4E-03		9.5E-01		NA
Benzo(a)pyrene	6.0		5.8	5.0E-02		3.4E-03		9.5E-01		NA
Benzo(b)fluoranthene	6.1		5.8	5.0E-02		3.4E-03		9.5E-01		NA
Benzo(k)fluoranthene	6.1		5.8	5.0E-02		3.4E-03		9.5E-01		NA
Benzo (g,h,i) perylene	6.51		5.8	5.0E-02		3.4E-03		9.5E-01		NA
Carbazole	3.76	[g]		5.0E-02		5.2E-02		1.5E-01		NA
Chrysene	5.7		5.8	5.0E-02		3.4E-03		9.5E-01		NA
Dibenzo(a,h)anthracene	6.5		5.8	5.0E-02		3.4E-03		9.5E-01		NA
bis(2-Ethylhexyl)phthalate	5.1			5.0E-02		8.7E-03		1.9E-01		NA
Fluoranthene	4.95		5.8	5.0E-02		3.4E-03		9.5E-01		NA
Indeno(1,2,3-cd)pyrene	6.6		5.8	5.0E-02		3.4E-03		9.5E-01		NA
Phenanthrene	4.5		5.8	5.0E-02		3.4E-03		9.5E-01		NA
Pyrene	5.3		5.8	5.0E-02		3.4E-03		9.5E-01		NA
PESTICIDES/PCBs										
4,4'-DDD	6			3.3E+00	[ab]	1.0E-02	[ac]	1.2E+00	[ad]	2.9E+00 [(ae)
4,4'-DDE	5.7			1.7E+00	[ab]	1.0E-02	[ac]	1.2E+00	[ad]	2.9E+00 [(ae)
4,4'-DDT	6.4			5.7E-01	[ab]	1.0E-02	[ac]	1.2E+00	[ad]	2.9E+00 [(ae)
Aroclor-1254	7.1	[h]		5.8E+00	[i]	1.2E-01	[i]	3.8E+00	[j]	3.2E-01 [k]
Dieldrin	4.6			5.5E+00	[o]	1.7E-02		1.5E+00	[p]	4.4E-01 [q]
INORGANICS										
Aluminum	NA			7.5E-02	[r]	8.0E-04	[s]	7.5E-02	[t]	NA
Arsenic	NA			6.6E-03	[ag]	3.0E-01	[ah]	1.0E-01	[t]	6.0E-03
Barium	NA			7.5E-03	[r]	3.0E-02	[s]	7.5E-03	[t]	NA
Cadium	NA			1.1E+01	[u]	3.3E+01	[v]	2.1E+00	[t]	3.8E-01 [w]
Chromium	NA			1.6E-01	[ai]	1.5E-03	[s]	2.8E-01	[t]	2.8E-01

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Analyte	Log K_{ow} [b]	Bioaccumulation Factor [a] Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]
Copper	NA	1.6E-01 [l]	7.8E-01 [x]	6.0E-01 [v]	NA
Lead	NA	7.8E-02 [y]	0.0E+00 [v]	1.5E-02 [t]	NA
Manganese	NA	2.0E-02 [r]	5.0E-02 [s]	2.0E-02 [t]	NA
Mercury	NA	6.80E-02 [z]	1.8E-01 [s]	1.0E-02 [aa]	2.3 [aa]
Silver	NA	1.5E-01 [r]	8.0E-02 [s]	1.5E-01 [t]	NA
Vanadium	NA	1.2E-01 [r]	1.1E-03 [s]	1.2E-01 [t]	NA
Zinc	NA	1.8E+00 [l]	6.1E-01 [x]	2.1E+00 [t]	NA

NOTES:

[a] Units for bioaccumulation factors (BAFs) are mg/kg (fresh) tissue weight over mg/kg (dry) soil weight for invertebrates and plants. The BAF units for small mammals and small birds are mg/kg (fresh) tissue weight over mg/kg (fresh) food weight.

[b] Log K_{ow} values are from the Superfund Chemical Data Matrix (USEPA, 1993), unless otherwise noted. Average Log K_{ow} for classes of semivolatiles are presented in the second log K_{ow} column. When available, chemical class log K_{ow} averages are used instead of chemical specific log K_{ow} to calculate BAF values.

[c] The value is an average BAF for semivolatiles measured in earthworms (Beyer, 1990) , unless otherwise noted. Dry weight values were converted to wet weight assuming earthworm are 80% water ($BAF_{weight\ weight} = BAF_{dry\ weight}/ 0.2$).

[d] Plant BAF were calculated using the following equation presented by Travis and Arms (1988) unless otherwise noted: log (Plant Bioaccumulation Factor)=1.588-0.578 (log K_{ow}). The calculated plant BAF value was converted from dry weight to wet weight by dividing the BAF by a factor of 0.2 (assuming 80% water content of plants) ($BAF_{weight\ weight} = BAF_{dry\ weight}/ 0.2$).

[e] Mammalian BAFs were calculated using the following equation from Travis and Arms (1988), unless otherwise noted: log BTF (biotransfer factor) = Log K_{ow} - 7.6.

To convert from BTF to BAF, the calculated log BTF is first transformed to base 10 than multiplied by the average ingestion rates for nonlactating and lactating test animals (12 kg/day). BAFs are convert from dry to wet feed weight by divided the BAF by a factor of 0.2 ($BAF_{wet\ weight}$ = BTF *12 mg/day/0.2). There is an uncertainty involved in using this equation for PAHs because the study by Travis and Arms (1988) did not use PAHs in the regression analysis.
For semivolate analytes with Log K_{ow} less than 5 (log $K_{ow} < 5$) the BAF was assigned a minimal value of 0.15.

When no literature values for pesticides and PCBs were available, the BAF was calculated regardless of the Log K_{ow}, due to the

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Analyte	Bioaccumulation Factor [a]				
	Log K_{ow} [b]	Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]

tendency of these lipophylic compounds to bioaccumulate.

[f] Bioaccumulation data are generally lacking for avians. Therefore, there is uncertainty associated with estimating body-dose for birds without considering what chemicals may bioacumulated in prey-item tissue.

[g] Hansch and Leo (1976).

[h] USEPA (1990) Basics of Pump-and-Treat Ground-Water Remediation Technology

[i] Aroclor 1260 is used as a surrogate.

[j] BAF calculated from discussion in Eisler (1986) stating that Aroclor 1254 residues in subcutaneous fat of adult minks were up to 38 times dietary levels. Converted to whole body concentrations assuming 10% lipid content.

[k] BAF calculated from discussion in Eisler, 1986. Kestrels fed 33 mg PCB/kg diet for 62-69 days accumulated 107 mg PCB/kg lipid weight in muscle. Assuming muscle is 10% lipid content, the muscle concentration is estimated at 10.7 mg/kg.

[l] BAF for earthworms from Diercxsens et al. (1985).

[m] Arithmetic mean BAF for corn, leaves, carrots, beets, sugarbeets, radishes, and soybeans (tops, roots, and whole plants) from USEPA (1985c) and Webber et al. (1983).

[n] Aroclor 1254 is used as a surrogate.

[o] Geometric mean of reported BAFs for earthworms (Gish, 1970) converted from dry weight to wet weight assuming 80% water composition of earthworms.

[p] BAF calculated from data presented by Potter et al (1974). Based on an average dieldrin concentration in cow muscle and fat of 0.17 mg/kg (dry weight) and a dieldrin concentration of 0.11 mg/kg in the diet (dry weight).

[q] Jeffries and Davis (1968).

[r] Prey-specific value is not available. The value shown is the small mammal BAF for this chemical.

[s] Value from Baes et al. (1984) for leafy portions of plants multiplied by 0.2 to represent 80% water composition of plants.

[t] Value derived from BTFs, presented in Baes et al. (1984) for uptake into cattle. BTF converted to BAF by multiplying by food ingestion rate of 50 kg/day wet weight.

[u] Mean of values reported for Sorex araneus in MacFadyen (1980).

[v] Mammal value for copper and plant value for cadmium from Levine et al. (1989). Lead does not accumulate in plant tissue; therefore, a BAF of zero was assigned.

[w] Based on accumulation of cadmium in kidneys of European quail in Pimentel et al. (1984).

[x] Median of values reported from Levine et al. (1989).

[y] Geometric mean of BAF values (fresh weight/dry weights) for worms and woodlice (USEPA, 1985a). Fresh weight tissue concentrations calculated assuming 80% body water content.

[z] Uptake value (fresh wt./dry wt.) for earthworms from USEPA (1985b) sludge document. Fresh weight tissue concentration calculated

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Analyte	Log K_{ow} [b]	Bioaccumulation Factor [a]			
		Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]

assuming 80% body water content.

[aa] USEPA. 1985b.

[ab] Geometric means of 4,4'-DDT (Davis (1968), Davis & Harrison (1966), Wheatley & Hardman (1968), Bailey (1970), Cramp & Olney (1967), Beyer & Gish (1980), 4,4'DDE {Davis (1968), Davis & Harrison (1966), Wheatley & Hardman (1968), Bailey (1970), Cramp & Olney (1967), Cramp & Olney (1967), etc.] reported for earthwaorms. Dry soil conc. Calculayed assuming 10% moisture content in sandy-loam soils.

[ac] Geometric mean of 4,4'DDT & 4,4'-DDE BAFs (fresh wt/dry wt) reported for roots (carrot, potato), grains, and legumes derived from USEPA (1985b) converted from dry wt. To wet wt. Per values provided by Suter (1993).

[ad] BAF for shrews & voles calculated using measured conc. Of DDT in stomach contant and in whole body (Forsyth & Petrle, 1984).

[ae] Whole-body phesant BAF for 4,4'-DDT presented in SUEPA (1985b); derived from Kenaga (1973).

[af] Amphipod to sediment mean biomagnification factor for total DDT in Lake Michigan and Lake Ontario (1991).

[ag] Average of values of industrial soils fom Beyer & Cromatie (1987) multiplied by 0.2 to represent 90% water composition in earthworms.

[ah] Average of BAF values reported from Wang et. Al (1984), Sheppard et al. (1985), and Merry et al. (1986).

[ai] From Barnthouse (1988).

Notes:

Log Kow = Logarithm transformation of the octanol/water partitioning coefficient
NA = not available.
PCB's = polychlorinated biphenyls.
BAF = bioaccumulation factor
mg/kg = milligrams per kilogram.
BTF = biotransfer factor.
> = greater than.
< = less than.
% = percent.

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Analyte	Log K_{ow} [b]	Bioaccumulation Factor [a]			
		Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]

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Site 16
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Analyte	Bioaccumulation Factor [a]				
	Log K_{ow} [b]	Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]

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Table H - 2
Ingestion Toxicity Information for Wildlife

Remedial investigation Report
Site 16
NAS Whiting Field
Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day Oral LD_{50}	Lethal RTV mg/kg-BW-day LOAEL	Lethal RTV mg/kg-BW-day RTV[1]	Sublethal RTV mg/kg-BW-day LOAEL	Sublethal RTV mg/kg-BW-day NOAEL	Sublethal RTV mg/kg-BW-day RTV[2]	References
Semivolatile Organic Compounds											
Benzo(a)anthracene	Rodents	Oral (chronic)	HR	Carcinogenicity				2			Eisler, R., 1987b
Benzo(a)pyrene	Rat	Oral (chronic)	Pregnancy	Sterility in offspring				40			USEPA, 1984b
	Rat	Oral (chronic)	3.5 months	Reproductive				50			USEPA, 1984b
	Mouse	Oral	Multigenerational	Decreased fertility of F1 progeny; decreased F2 litter size.				[3] 10		10	MacKenzie, et al. 1981
	Mouse	Oral (subchronic)	6 months	Mortality		120	12				USEPA, 1984c
Benzo(b)fluoranthene	Rodents	Oral (chronic)	NR	Carcinogenicity				40			Eisler, R., 1987b
Benzo(k)fluoranthene											
Benzo(g,h,i)perylene	Rodents	Oral (chronic)	NR	Carcinogenicity				99			Eisler, R., 1987b
Carbazole	Rat	Oral LD_{50}		Mortality	500		100				USEPA, 1986
Chrysene	Rodents	Oral (chronic)	NR	Carcinogenicity				99			Eisler, R., 1987b
Dibenz(a,h)anthracene	Rat	Oral (chronic)	3.5 months	Reproductive				50			USEPA, 1984c
bis(2-Ethylhexyl)phthalate	Rat	Oral LD_{50}	NR	Mortality	30,600						RTECS, 1993
	Rat	Oral	NR	Reproductive effects				7,140			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				35		3.5	RTECS, 1993
	Rat	Oral	NR	Reproductive effects				6,000			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				17,200			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				10,000			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				9,766			RTECS, 1993
	Mouse	Oral LD_{50}	NR	Mortality	30,000						RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				78,880			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				4,200			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				50			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				1,000			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				2,040			RTECS, 1993
	Rabbit	Oral LD_{50}	NR	Mortality	34,000						RTECS, 1993
	Guinea pig	Oral LD_{50}	NR	Mortality	26,000						RTECS, 1993
	Guinea pig	Oral	NR	Reproductive effects				20,000			RTECS, 1993
	Mammal	Oral	NR	Reproductive effects				20,000			RTECS, 1993
	Mammal	Oral	NR	Reproductive effects				509,000			RTECS, 1993
	Mouse	Oral LD_{50}		Mortality	800		160				RTECS, 1993
	Mouse	Oral (subchronic)	13 weeks	Renal effects				125			RTECS, 1993
Fluoranthene	Rat	Oral LD_{50}	NR	Mortality	2,000		400				RTECS, 1994
	Mouse	Oral (subchronic)	90 days	Nephropathy; clinical and pathological effects				250	125		IRIS, 1993
Indeno(1,2,3-cd)pyrene	Rodents	Oral (chronic)	NR	Carcinogenicity				72			Eisler, R., 1987b

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					Oral LD_{50}	LOAEL	RTV [1]	LOAEL	NOAEL	RTV [2]	
Phenanthrene	Mouse	Oral LD_{50}	NR	Mortality	700		140				RTECS, 1994
	Mouse	Oral (subchronic)	6 months	Increased liver weight				120			IRIS, 1993
Pyrene	Rat	Oral LD_{50}	NR	Mortality	2,700						RTECS, 1993
	Mouse	Oral LD_{50}	NR	Mortality	800		160				RTECS, 1993
	Mouse	Oral (chronic)	13 weeks	Renal effects				125	75		IRIS, 1993
Pesticides/PCBs											
4,4'-DDD	Rat	Oral LD-d50	NR	Mortality	800						RTECS, 1993
	Mouse	Oral LD-d50	NR	Mortality	700						RTECS, 1993
	Hampster	Oral LD-d50	NR	Mortality	>5,000						RTECS, 1993
	Mallard	Oral LD-d50	NR	Eggshell thinning				2.91			USEPA, 1993c
	Mallard	Oral LD-d50	NR	Reproductive: embryo mortality, cracked egg				0.58			USEPA, 1993c
	Kestrel	Oral LD-d50	NR	Eggshell thinning				0.39			USEPA, 1993c
4,4'-DDE	Rat	Oral LD-d50	NR	Mortality	87						RTECS, 1993
4,4'-DDT	Rat	Oral LD-d50		Mortality	100						USEPA, 1985
	Rat	Oral	NR	Reproductive				112			RTECS, 1993
	Rat	Oral	NR	Reproductive				100			RTECS, 1993
	Rat	Oral	NR	Reproductive				430			RTECS, 1993
	Rat	Oral	NR	Reproductive				1890			RTECS, 1993
	Rat	Oral	NR	Reproductive				250			RTECS, 1993
	Rat	Oral	NR	Reproductive				50			RTECS, 1993
	Rat	Oral (chronic)	3 generations	Reproductive				0.2			IRIS, 1991
	Rat	Oral	2 years	Reproductive				2.5			USEPA, 1993c
	Mouse	Oral LD-d50	NR	Mortality	135						RTECS, 1993
	Mouse	Oral LD-d50		Mortality	200						USEPA, 1985d
	Mouse	Oral	NR	Reproductive				504			RTECS, 1993
	Mouse	Oral	NR	Reproductive				81			RTECS, 1993
	Mouse	Oral	NR	Reproductive				124			RTECS, 1993
	Mouse	Oral	NR	Reproductive				148			RTECS, 1993
	Rabbit	Oral LD-d50	NR	Mortality	250						RTECS, 1993
	Rabbit	Oral	NR	Reproductive				150			RTECS, 1993
	Guinea Pig	Oral LD-d50	NR	Mortality	150						RTECS, 1993
	Hamster	Oral LD-d50	NR	Mortality	>5000						RTECS, 1993
	Dog	Oral LD-d50	NR	Mortality	150						RTECS, 1993
	Dog	Oral LD-d50		Mortality	60						USEPA, 1985d
	Dog	Oral	NR	Reproductive				3540			RTECS, 1993
	Dog	Oral (chronic)	14 months	Stillbirth, delayed estrus, reduced libido				12			ATSDR, 1992b
	Monkey	Oral LD-d50	NR	Mortality	200						RTECS, 1993

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	Chicken	Oral (subchronic)	10 weeks	Decreased repdoductive success; toxic symptoms				91.4			USEPA, 1985d
	Rock Dove	Oral LD-d50		Mortality	4000						USFWS, 1984
	Black Duck	Oral (chronic)	2 years	Reduced eggshell thickness				0.14			Longcore & Stendel
	Mallard	Oral LD-d50		Mortality	2240						USFWS, 1984
	Mallard	Oral (subchronic)	96 days	Reduced eggshell thickness				2.8			Longcore & Stendel
	Mallard	Oral	NR	Eggshell thinning				1.16			USEPA, 1993c
	Mallard	Oral	NR	Eggshell thinning				2.91			USEPA, 1993c
	Mallard	Oral	2 years	Reproductive				1.45			USEPA, 1993c
	California quail	Oral LD-d50		Mortality	595						USFWS, 1984
	Japanese quail	Oral LD-d50		Mortality	841						USFWS, 1984
	Phesant	Oral LD-d50		Mortality	1334						USFWS, 1984
	Sandhill Crane	Oral LD-d50		Mortality	1200						USFWS, 1984
	Kestrel	Oral (chronic)	7 wk - 1 year	Reduced eggshell thickness				0.56			USEPA, 1985d
	Kestrel	Oral (chronic)	1 year	Reduced eggshell thickness				0.16			Wiemeyer, et al.
	Barn owl	Oral (chronic)	2 years	Reduced eggshell thickness				0.14			Longcore & Stendel
Aroclor 1254	Mouse	Oral	NR	Reproductive				1.53		0.153	USEPA, 1993b
	Chicken	Oral (chronic)	NR	Embryonic mortality				0.9			USEPA, 1976
	Rock dove	Oral (chronic)	NR	Parental incubation behavior				0.9		0.09	Peakall, D.B., et al., 1973
	American kestrel	Oral (chronic)	69 days	Reduced sperm concentration				9		0.9	Eisler, R., 1986,
	Mink	Oral dose	160 days	Reproductive				0.096		0.0096	USEPA, 1993b
	Mink	Oral	NR	Kit growth				0.15			USEPA, 1993b
	Mink	Oral	12.5 days	Reproductive				0.375			USEPA, 1993b
	Chicken	Oral	39 weeks	Egg production and fertility				2.44			USEPA, 1993b
	Chicken	Oral	NR	Egg production and hatchability				9.8			USEPA, 1993b
	Chicken	Maternal diet	NR	Chick growth				0.98			USEPA, 1993b
	Pheasant	Oral	16 weeks	Egg hatchability				1.8			USEPA, 1993b
Dieldrin	Mouse	Oral LD_{50}	NR	Mortality	38		7.6				Allen, J.R., et al., 1979
	Mouse	Oral (chronic)	80 weeks	Body tremors				0.33			NCI, 1978
	Mouse	Oral (chronic)	2 year	Liver enlargement w/ histopathology				0.1			IRIS, 1993
	Mouse	Oral (chronic)	2 year	Hepatic cancer				1.3			ATSDR, 1992
	Rat	Oral (chronic)	2 year	Histologic changes				2			ATSDR, 1992
	Rat	Oral (chronic)	2 year	Liver lesions				0.05	0.005		IRIS, 1993
	Dog	Oral (chronic)	2 year	Increased liver weight; liver/body weight				0.05	0.005		IRIS, 1993
	Dog	Oral (chronic)	25 months	Hepatocyte degeneration				0.5			ATSDR, 1992
	Monkey	Oral (chronic)	120 days	Tremors and convulsions				0.1			Smith, R.M., et al., 1976
	Mouse	Oral (subchronic)	4 weeks	Decreased pup survival				0.65		0.065	Virgo, B.B., et al., 1975
	Rat	Oral LD_{50}	NR	Mortality	46						Allen, J.R., et al., 1979
	Guinea pig	Oral LD_{50}	NR	Mortality	25		5				Allen, J.R., et al., 1979

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					Oral LD_{50}	LOAEL	RTV [1]	LOAEL	NOAEL	RTV [2]	
	Rabbit	Oral LD_{50}	NR	Mortality	45						Allen, J.R., et al., 1979
	House sparrow	Oral LD_{50}	NR	Mortality	48						USFWS, 1984
	Chicken	Oral LD_{50}	NR	Mortality	20						Allen, J.R., et al., 1979
	Rock dove	Oral LD_{50}	NR	Mortality	27						Virgo, B.B., et al., 1975
	Gray partridge	Oral LD_{50}	NR	Mortality	9						Virgo, B.B., et al., 1975
	Chukar	Oral LD_{50}	NR	Mortality	25						Virgo, B.B., et al., 1975
	Japanese quail	Oral LD_{50}	5 days	Mortality	[4] 6		1.2				Hill, E.F. et al., 1975
	Japanese quail	Oral LD_{50}	NR	Mortality	70						Virgo, B.B., et al., 1975
	California quail	Oral LD_{50}	NR	Mortality	9						Virgo, B.B., et al., 1975
	Bobwhite	Oral LD_{50}	5 days	Mortality	[4] 3		6				Hill, E.F. et al., 1975
	Pheasant	Oral LD_{50}	NR	Mortality	79						Virgo, B.B., et al., 1975
	Mallard	Oral LD_{50}	5 days	Mortality	[4] 12						Hill, E.F. et al., 1975
	Mallard	Oral LD_{50}	5 days	Mortality	[4] 11						Hill, E.F. et al., 1975
	Mallard	Oral LD_{50}	NR	Mortality	381						Virgo, B.B., et al., 1975
	Whistling duck	Oral LD_{50}	NR	Mortality	100						Virgo, B.B., et al., 1975
	Canada goose	Oral LD_{50}	NR	Mortality	141						Virgo, B.B., et al., 1975
	Goat	Oral LD_{50}	NR	Mortality	100						Allen, J.R., et al., 1979
	Sheep	Oral LD_{50}	NR	Mortality	50						Allen, J.R., et al., 1979
	Cattle	Oral LD_{50}	NR	Mortality	60						Allen, J.R., et al., 1979
	Mule deer	Oral LD_{50}	NR	Mortality	75						Allen, J.R., et al., 1979
	Cat	Oral LD_{50}	NR	Mortality	300						Allen, J.R., et al., 1979
	Dog	Oral LD_{50}	NR	Mortality	65		13				Allen, J.R., et al., 1979
<u>Inorganic Analytes</u>											
Aluminum	Mouse	Oral (chronic)	2-3 generations	Reduced body weight gain of newborns				[5] 425		425	NIOSH, 1985
	Rat	Oral (subchronic)	15 days	Reduced growth				100			Bernuzzi, V., et al., 1989
	Rat	Oral LD_{50}	NR	Mortality	3,700		740				Sax, N.I, 1984
Arsenic	Rat	Oral	NR	Reproductive effects			0.61				RTECS, 1993
	Rat	Oral	NR	Reproductive effects			0.58				RTECS, 1993
	Rat	Oral LD-d50	NR	Mortality	763						RTECS, 1993
	Mouse	Oral LD-d50	NR	Mortality	145						RTECS, 1993
	Mallard	Oral LD-d50	NR	Mortality	323						Eisler, 1988
	Cowbird	Oral LD-d50	NR	Mortality	18						Eisler, 1988
	Young chicken	Oral	11 days	Egg production					1		Hermeyer, 1971
	Dog	Oral (chronic)	56 days	Mortality		3.1					ATSDR, 1991
Barium	Rat	Oral (chronic)	68 weeks	Renal ultrastructure changes				142			IRIS, 1993
	Rat	Oral (subchronic)	13 weeks	Renal effects				91			Dietz, D.D., et al., 1992
	Rat	Oral (acute)	10 days	Decreased ovarian weight				198		19.8	ATSDR, 1990a

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	Rat	Oral (subchronic)	13 weeks	20% population mortality		430	43				Dietz, D.D., et al., 1992
Cadmium	Rat	Oral	NR	Reproductive effects				155			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				220			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				21.5		2.15	RTECS, 1993
	Rat	Oral	NR	Reproductive effects				23			RTECS, 1993
	Rat	Oral LD_{50}		Mortality	250						Eisler, R., 1985
	Rat	Oral LD_{50}	NR	Mortality	225						RTECS, 1993
	Mouse	Oral LD_{50}	NR	Mortality	890						RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				448			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				1,700			RTECS, 1993
	Guinea pig	Oral LD_{50}	NR	Mortality	150		30				Eisler, R., 1985
	Mallard	Oral (subchronic)	90 days	Egg production suppressed				10		1	Eisler, R., 1985
Chromium	Japanese quail	Oral LD_{50}	5 days	Mortality	126						Hill & Camardese
	Rat	Oral (subchronic)	90 days	Histopathoogic & reproductive effects					1400		Ivankovic & Preuss
	Mouse	Oral (chronic)	7 weeks	Decreased spermatogenesis				3.5			ATSDR, 1993
	Black Duck	Oral (subchronic)	5 months	Reproductive effects					200		Outridge & Sche
	Rat	Oral LD_{50}		Mortality	200						ATSDR, 1991
Copper	Rat	Single oral dose		Reproductive effects	91			152			RTECS, 1993
	Rat	Oral LD_{50}	NR	Mortality	940		188				Sax, N.I, 1984
	Mouse	Oral (chronic)	30 days	Decreased litter sizes with teratogenic effects				100		10	Lecyk, M., 1980
Lead	Rat	Oral	NR	Reproductive effects				790			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				1,140			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				520			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				1,100			RTECS, 1993
	Calf	Oral LD_{50}	NR	Mortality	220						Eisler, R., 1988
	Rat	Oral (subchronic)	12-14 days	Decreased fetal body weight				2.5			McClain, R.M., et al., 1972
	Mouse	Oral	NR	Reproductive effects				1,120			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				6,300			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				300		30	RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				4,800			RTECS, 1993
	Domestic animal	Oral	NR	Reproductive effects				662			RTECS, 1993
	Mammal	Oral	NR	Reproductive effects				2,118			RTECS, 1993
	Kestrel	Diet	NR	Decreased egg laying fertility; decreased egg shell thickness					4.61	4.61	Eisler, R., 1988
	Kestrel nestlings	Oral	10 days	Reduced growth and brain weight; abnormal development				125			Eisler, R., 1988
	Japanese quail	Oral LD_{50}	5 days	Mortality	24,752						Hill, E.F., et al., 1986

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	Rat	Oral (chronic)	2 generations	Developmental effects					7		Kimmel, C.A., et al., 1980
	Guinea pig	Oral LD_{50}		Mortality	300		60				Sax, N.I, 1984
	Rock dove	Oral (chronic)	NR	Kidney pathology; learning deficiencies				6.25			Allen, J.R., et al., 1979
	Rock dove	Oral LD_{50}		Mortality	375		75				Kendall, R.J., et al., 1985
Manganese	Mouse	Oral (subchronic)	90 days	Delayed growth of testes				140		14	ATSDR, 1990b
	Mouse	Oral (chronic)	103 weeks	Mortality	4,050						ATSDR, 1990b
	Rat	Oral LD_{50}	NR	Mortality	410						ATSDR, 1990b
	Rat	Oral LD_{50}	20 days	Mortality	225		45				ATSDR, 1990b
	Rat	Oral (subchronic)	20 days	Decreased litter weight during gestation					620		ATSDR, 1990b
	Rat	Oral (chronic)	103 weeks	Mortality	930						ATSDR, 1990b
	Guinea pig	Oral LD_{50}	NR	Mortality	400						USEPA, 1984a
	Monkey	Oral (chronic)	18 months	Weakness, rigidity				25			ATSDR, 1990b
	Rodents/livestock	Oral (subchronic)	10 days - 2 month	Decreased growth rate				100			Cunningham, et al., 1966
	Mouse	Oral (subchronic)	180 days	Mortality		2,300					Gianutsos, G., et al,, 1982
Mercury	Mouse	Oral LD_{50}		Mortality	22		4.4				NIOSH, 1985
	Rock dove	Oral LD_{50}		Mortality	22.8						Eisler, R., 1987a
	Chicken	Oral LD_{50}		Mortality	20		4				Fimreite, N., 1979
	Corturnix	Oral LD_{50}		Mortality	11						Eisler, R., 1987a
	Bobwhite quail	Oral LD_{50}	5 days	Mortality	523						Hill, E.F. et al., 1975
	Ring-necked pheasa	Oral LD_{50}		Mortality	11.5						Eisler, R., 1987a
	Mouse	Oral (subchronic)	50 days	Embryotoxicity and teratogenicity				0.9			Suzuki, T., 1979
	Mouse	Oral (subchronic)	Day 6-17 (gest)	Stillbirths and neonatal death				4			Suzuki, T., 1979
	Rat	Oral (chronic)	NR	Reduced fertility				0.5		0.05	Eisler, R., 1987a
organomercury	Rat	Oral (subchronic)	Day 6-14 (gest)	Retarded fetus growth				4			Suzuki, T., 1979
organomercury	Rat	Oral LD_{50}		Mortality	18		3.6				NIOSH, 1985
organomercury	Pig	Oral (subchronic)	Pregnancy	High incidence of stillbirths				0.5		0.05	Eisler, R., 1987a
organomercury	Mule deer	Oral LD_{50}		Mortality	17.9						Eisler, R., 1987a
organomercury	River otter	Oral LD_{50}		Mortality	2						Eisler, R., 1987a
organomercury	Mink	Oral LD_{50}		Mortality	1		0.2				Eisler, R., 1987a
organomercury	Gray partridge	Oral LD_{50}		Mortality	17.6						Eisler, R., 1987a
methylmercury	Dog	Oral (subchronic)	Pregnancy	High incidence of stillbirths				0.1		0.01	Eisler, R., 1987a
methylmercury	Chukar	Oral LD_{50}		Mortality	26.9						Eisler, R., 1987a
methylmercury	Mallard	Oral	NR	Reproduction, behavior				0.064		0.0064	USEPA, 1993c
methylmercury	Black duck	Oral (subchronic)	28 weeks	Reproduction inhibited				[4] 0.22			Eisler, R., 1987a
methylmercury	Fulvous whistling d	Oral LD_{50}		Mortality	37.8						Eisler, R., 1987a
methylmercury	Northern bobwhite	Oral LD_{50}		Mortality	23.8						Eisler, R., 1987a
methylmercury	Gray pheasant	Oral (subchronic)	30 days	Reduced reproductive ability				0.64			Eisler, R., 1987a
ethylmercury	House sparrow	Oral LD_{50}		Mortality	12.6						Eisler, R., 1987a

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ethylmercury	Bantam chicken	Oral LD_{50}		Mortality	190						Fimreite, N., 1979
ethylmercury	Prairie chicken	Oral LD_{50}		Mortality	$\boxed{11.5}$		$\boxed{2.3}$				Eisler, R., 1987a
ethylmercury	Japanese quail	Oral LD_{50}		Mortality	14.4						Eisler, R., 1987a
Silver	Mouse	Intraperitoneal (acute)		Mortality	$\boxed{34}$		$\boxed{6.8}$				NIOSH, 1985
	Rat	Oral (chronic)	37 week	Weight gain				222.2			ATSDR, 1990d
	Mouse	Oral (chronic)	125 days	Hypoactivity				18.1			ATSDR, 1990d
Vanadium	Japanese quail	Oral LD_{50}	5 days	Mortality	$\boxed{96}$		$\boxed{19.2}$				Hill, E.F., et al., 1986
	Mouse	Gavage LD_{50}	One time	Mortality	$\boxed{31}$		$\boxed{6.2}$				ATSDR, 1990e
	Rat	Oral (subchronic)	2 months	Hypertension				15			Susic, D., et al., 1986
	Rat	Oral (subchronic)	35 days	Development effects					$\boxed{8.4}$	$\boxed{8.4}$	Domingo, J.L., et al., 1986
	Chicken	Oral (subchronic)	6 weeks	Decrease in egglaying				$\boxed{^{6}\ 11}$		$\boxed{1.1}$	Berg, L.R., et al., 1963
Zinc	Rat	Oral LD_{50}		Mortality	$\boxed{2{,}510}$		$\boxed{502}$				RTECS, 1993
	Rat	Oral	Gestation	Fetal resorptions in 4 to 20% of population				$\boxed{200}$		$\boxed{20}$	Schlicker, S.A., et al., 1968
	Ferret	Oral	3-13 days	Mortality and gastrointestinal effects		390					Straube, E.F., et al., 1980
	Rat	Oral (subchronic)	NR	Kidney toxicity				160			Llobet, J.M. et al., 1988
Total Recoverable Petroleum Hydrocarbons											
TRPH	NA	NA	NA	NA							

[1] Selected lethal RTVs are boxed. The lethal RTVs correspond to the NOAEL when available. When an NOAEL is not available, then the RTV value is calculated by appling a ten-fold application factor to the LOAEL or a five-fold application factor to the Oral LD50.

[2] Selected sublethal RTVs are boxed. The sublethal RTV corresponds to the NOAEL when available. When an NOAEL is not available, the sublethal RTV value is calculated by appling a ten-fold application factor to the sublethal LOAEL.

[3] Value for benzo(a)pyrene chosen as a surrogate for all PAHs. Chemical-specific toxicity studies for ecologically significant endpoints are lacking for other PAHs. The sublethal RTV is equal to the LOAEL value because the toxicity test is multi-generational in duration.

[4] Converted to dose per kilogram body weight by multiplying the reported value by ingestion rate and dividing by body weight. Body weights for birds obtained from Dunning, 1984. Ingestion rates were calculated using the following regression equation (for all birds) from USEPA , 1993a): Food Ingestion (kg/day) = 0.00582 * Body Weight$^{0.651}$ (kg). Ingestion rates for the chicken from NRC, 1984.

[5] Sublethal RTV for aluminum is equal to the LOAEL value because the toxicity test is multi-generational in duration.

[6] Converted from 30 ppm to 11 mg/kg BW-day using standard default parameters USEPA, 1988.

Notes: mg/kg = milligrams per kilogram.
RTV = reference toxicity value.
BW = Body weight.
LD_{50} = dose resulting in 50% mortality in test population.
LOAEL = lowest observed adverse effect level.
NOAEL = no observed adverse effect level.

Table H - 2
Ingestion Toxicity Information for Wildlife

Remedial investigation Report
Site 16
NAS Whiting Field
Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD_{50}	LOAEL	RTV [1]	LOAEL	NOAEL	RTV [2]	

NR = not reported.
PCBs = polychlorinated biphenyls.
PAH = polynuclear aromatic hydrocarbons.
$LC_{20,10}$ = lethal concentration for 20% or 10% of the population.
> = greater than.
% = percent.
gest = gestation.

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Table H - 2
Ingestion Toxicity Information for Wildlife

Remedial investigation Report
Site 16
NAS Whiting Field
Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD_{50}	LOAEL	RTV [1]	LOAEL	NOAEL	RTV [2]	

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Table H - 2
Ingestion Toxicity Information for Wildlife

Remedial investigation Report
Site 16
NAS Whiting Field
Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD_{50}	LOAEL	RTV [1]	LOAEL	NOAEL	RTV [2]	

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Table H - 3
RTVs Selected for Ecological Risk Assessment [a]
Units (mg/kgBW/day)

Remedial investigation Report
Site 16
Naval Air Station Whiting Field
Milton, Florida

Analyte	Small Mammal [b]		Small Bird [c]		Predatory Mammal [d]		Predatory Bird [e]	
	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal
Semivolatile Organic Compounds								
Benzo(a)anthracene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Benzo(a)pyrene	12	10	NA	NA	12	10	NA	NA
Benzo(b)fluoranthene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Benzo(g,h,i)perylene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Benzo(k)fluoranthene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Carbazole	100	NA	NA	NA	100	NA	NA	NA
Chrysene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Dibenz (a,h) anthracene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
bis(2-Ethylhexyl)phthalate	160	3.5	NA	NA	160	3.5	NA	NA
Fluoranthene	400	10 [f]	NA	NA	400	10 [f]	NA	NA
Indeno(1,2,3-cd)pyrene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Phenanthrene	140	10 [f]	NA	NA	140	10 [f]	NA	NA
Pyrene	160	10 [f]	NA	NA	160	10 [f]	NA	NA
Pesticides/PCBs								
4,4'-DDD	17.4	0.2	119	0.14	12	12	119	0.14
4,4'-DDE	140	0.2	119	0.39	140	12	119	0.39
4,4'-DDT	140	0.2	119	0.14	12	12	119	0.14
Aroclor-1254	100 [g]	0.153	16 [g]	0.09	150 [g]	0.0096	16 [g]	0.9 [h]
Dieldrin	5	0.065	1.2	NA	13	0.065	1.2	NA
Inorganic Compounds								
Aluminum	740	425	NA	NA	740	425	NA	NA
Arsenic	29	0.58	3.6	1	3.1	0.58	3.6	1
Barium	43	19.8	NA	NA	43	19.8	NA	NA
Cadmium	30	2.15	NA	1	30	2.15	NA	1
Chromium	40	3.5	25.2	200	40	3.5	25.2	200
Copper	188	10	NA	NA	188	10	NA	NA
Lead	60	30	75	4.61	60	30	75	4.61
Manganese	45	14	NA	NA	45	14	NA	NA

Table H - 3
RTVs Selected for Ecological Risk Assessment [a]
Units (mg/kgBW/day)

Remedial investigation Report
Site 16
Naval Air Station Whiting Field
Milton, Florida

Analyte	Small Mammal [b]		Small Bird [c]		Predatory Mammal [d]		Predatory Bird [e]	
	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal
Mercury	4.4	0.05	4	0.064	4.4	0.05	4	0.064
Mercury (organic)	3.6	0.05	2.3	0.0064	0.2	0.01	2.3	0.0064
Silver	6.8	NA	NA	NA	6.8	NA	NA	NA
Vanadium	6.2	8.4	19.2	1.1	6.2	8.4	19.2	1.1
Zinc	502	20	NA	NA	502	20	NA	NA

Notes:

[a] Lethal RTVs correspond to the boxed lethal RTV presented in Table D-2. Lethal RTVs correspond to the highest NOAEL.
When an NOAEL value is not available then one-tenth of the lowest LOAEL, or one-fifth of the lowest LD_{50} is used as a surrogate value.
Sublethal RTVs correspond to the boxed sublethal RTV in table D-2. Lethal RTVs correspond to the highest NOAEL.
When an NOAEL value is not available, then one-tenth of the sublethal LOAEL is used as a surrogate.

[b] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the cotton mouse or short-tailed shrew.

[c] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the eastern meadowlark.

[d] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the red fox.
When no data are available, the small mammal value is used as a surrogate.

[e] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the great-horned owl. When no data are available, the small bird value is used as a surrogate.

[f] The value for benzo(a)pyrene was used as a surrogate.

[g] The value for Aroclor -1260 is used as a surrogate.

[h] The value for Aroclor - 1254 is used as a surrogate.

Notes:

NA = not available.
RTV = reference toxicity value.
LD_{50} = dose resulting in 50% mortality in test population.
LOAEL = lowest observed adverse effect level.
NOAEL = no observed adverse effect level.
PCBs = polychlorinated biphenyls.

Table H - 4
Summary of Toxicity Data for Plant Receptors
Remedial Investigation Report
Site 16
Naval Air Station Whiting Field
Milton, Florida

Analyte	Reference	RTV in Soil (mg/Kg)
SEMI-VOLATILE ORGANICS		
Benzo(a)anthracene		25 [b]
Benzo(a)pyrene		25 [b]
Benzo(b)fluoranthene		25 [b]
Benzo(k)fluoranthene		25 [b]
Benzo(g,h,i)perylene		25 [b]
Carbazole		NA
Chrysene		25 [b]
Dibenzo(a,h)anthracene		25 [b]
bis(2-Ethylhexyl)phthalate	Hulzebos *et al.*, 1993 [c]	>1,000
Fluoranthene		25 [b]
Indeno(1,2,3-cd)pyrene		25 [b]
Phenanthrene		25 [b]
Pyrene		25 [b]
PESTICIDES/PCBs		
4,4'-DDD		12.5 [d]
4,4'-DDE		12.5 [d]
4,4'-DDT		12.5 [d]
Aroclors	Will and Suter, 1994	40
Dieldrin		12.5 [d]
INORGANICS		
Aluminum	Will and Suter, 1994	50
Arsenic	Will and Suter, 1994	10
Barium	Will and Suter, 1994	500
Cadmium	Will and Suter, 1994	3
Chromium	Will and Suter, 1994	2
Copper	Will and Suter, 1994	100
Lead	Will and Suter, 1994	50

Table H - 4
Summary of Toxicity Data for Plant Receptors
Remedial Investigation Report
Site 16
Naval Air Station Whiting Field
Milton, Florida

Analyte	Reference	RTV in Soil (mg/Kg)
Manganese	Will and Suter, 1994	500
Mercury	Will and Suter, 1994	0.3
Silver	Will and Suter, 1994	2
Vanadium	Will and Suter, 1994	2
Zinc	Will and Suter, 1994	50

[a] RTVs in soil are equal to chemical concentrations in soil that are not expected to result in adverse effects to plants.
[b] Value represents 14-day growth EC_{50} for *Lactuca sativa* in soil.
[c] Value for acenaphthene used as a surrogate (Will and Suter, 1994).
[d] Value for 4,4'-DDT used as a surrogate.

Notes:
NA = Not Available.
RTV = reference toxicity value.
PCBs = polychlorinated biphenyls.

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Will, M.E., and G.W. Suter. 1994. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants. 1994 Rev. (September). Environmental Sciences Division. Oak Ridge, Tennessee: Oak Ridge National Laboratory.

Tab[illegible]-5
Summary of Toxicity Data for Terrestrial Invertebrates

Remedial Investigation Report
Site 16
Naval Air Station Whiting Field
Milton, Florida

Analyte	Test Type	Test Duration	Test Species	Chemical Concentration (mg/kg)	Effect	RTV (mg/kg)	Reference
SEMIVOLATILE ORGANIC COMPOUNDS							
Benzo(a)anthracene	Soil Test	14-day	*E. foetida*	173	LC_{50}	34 [a]	Neuhauser *et al*., 1985.
Benzo(a)pyrene	Soil Test	14-day	*E. foetida*	173	LC_{50}	34 [a]	Neuhauser *et al*., 1985.
Benzo(b and k)fluoranthene	Soil Test	14-day	*E. foetida*	173	LC_{50}	34 [a]	Neuhauser *et al*., 1985.
Benzo(g,h,i)perylene	Soil Test	14-day	*E. foetida*	173	LC_{50}	34 [a]	Neuhauser *et al*., 1985.
Carbazole	NA	NA	NA	NA	NA	NA	NA
Chrysene	Soil Test	14-day	*E. foetida*	173	LC_{50}	34 [a]	Neuhauser *et al*., 1985.
Dibenz(a,h)anthracene	Soil Test	14-day	*E. foetida*	173	LC_{50}	34 [a]	Neuhauser *et al*., 1985.
bis(2-Ethylhexyl)phthalate	Soil Test	14-day	4 test species	2,390	LC_{50}	478 [b]	Neuhauser *et al*., 1985.
Fluoranthene	Soil Test	14-day	*E. foetida*	173	LC_{50}	34 [a]	Neuhauser *et al*., 1985.
Indeno(1,2,3-cd)pyrene	Soil Test	14-day	*E. foetida*	173	LC_{50}	34 [a]	Neuhauser *et al*., 1985.
Phenanthrene	Soil Test	14-day	*E. foetida*	173	LC_{50}	34 [a]	Neuhauser *et al*., 1985.
Pyrene	Soil Test	14-day	*E. foetida*	173	LC_{50}	34 [a]	Neuhauser *et al*., 1985.
PESTICIDES/PCBs							
4,4'-DDD	Soil Test	NS	*NS*	60	58 % mortality	12 [e]	USEPA, 1985
4,4'-DDE	Soil Test	NS	*NS*	60	58 % mortality	12 [e]	USEPA, 1985
4,4'-DDT	Soil Test	NS	*NS*	60	58 % mortality	12	USEPA, 1985
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA
Dieldrin	Soil Test	89-day	*E. foetida*	10	6 % decrease in number of cocoons hatched		Reinecke and Venter, 1985
Dieldrin	Soil Test	89-day	*E. foetida*	30	26 % decrease in number of cocoons hatched	30	Reinecke and Venter, 1985
Dieldrin	Soil Test	89-day	*E. foetida*	100	36 % decrease in number of cocoons hatched		Reinecke and Venter, 1985
Dieldrin	Soil Test	89-day	*E. foetida*	100	50 % decrease in number of cocoons produced		Reinecke and Venter, 1985
Endrin	NA	NA	NA	NA	NA	NA	NA
INORGANIC ANALYTES							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Arsenic	Soil Test	14-day	*E. foetida*	100	0 % mortality	100	Bouche et al., 1987
Arsenic	Soil Test	14-day	*E. foetida*	200	100 % mortality		Bouche et al., 1987
Barium	NA	NA	NA	NA	NA	NA	NA
Cadmium	Soil Test	14-day	*E. foetida*	900	0 % mortality		Bouche et al., 1987
Cadmium	Soil Test	14-day	*E. foetida*	2,700	100 % mortality		Bouche et al., 1987
Cadmium	Soil Test	14-day	*E. foetida*	1,000 [c]	LC_{50}		van Gestel and van Dis, 1988
Cadmium	Soil Test	20-week	*E. foetida*	50 [d]	Decrease in cocoon production	50 [e]	Malecki et al., 1982
Cadmium	Soil Test	2-week	*E. foetida*	1,843	LC_{50}		Neuhauser et al., 1985
Chromium							
Copper	Soil Test	14-day	*E. foetida*	10	0 % mortality		Bouche et al., 1987
Copper	Soil Test	14-day	*E. foetida*	30	20 % mortality	30	Bouche et al., 1987

Table H - 5
Summary of Toxicity Data for Terrestrial Invertebrates

Remedial Investigation Report
Site 16
Naval Air Station Whiting Field
Milton, Florida

Analyte	Test Type	Test Duration	Test Species	Chemical Concentration (mg/kg)	Effect	RTV (mg/kg)	Reference
Copper	Soil Test	20-week	*E. foetida*	2,000 [d]	Decrease in cocoon production		Malecki et al., 1982
Copper	Soil Test	2-week	*E. foetida*	643	LC_{50}		Neuhauser et al., 1985
Lead	Soil Test	20-week	*E. foetida*	5,000 [d]	Decrease in cocoon production		Malecki et al., 1982
Lead	Soil Test	2-week	*E. foetida*	5,941	LC_{50}	1,190 [e]	Neuhauser et al., 1985
Manganese	NA	NA	NA	NA	NA	NA	NA
Mercury	Soil Test	14-day	*E. foetida*	36	0 % mortality	36	Bouche et al., 1987
Mercury	Soil Test	14-day	*E. foetida*	216	60 % mortality		Bouche et al., 1987
Silver	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Zinc	Soil Test	20-week	*E. foetida*	5,000 [d]	Decrease in cocoon production		Malecki et al., 1982
Zinc	Soil Test	2-week	*E. foetida*	662	LC_{50}	130 [e]	Neuhauser et al., 1985

NOTES:

[a] Equal to the lowest LC_{50} in each chemical class, multiplied by a safety factor of 0.2.
Value for fluorene used for PAHs.

[b] Mean of LC_{50} for four test species (*A. teberculata, E. foetida, E. eugeniae,* and *P. excavatus*) from artificial soil tests; values used for a whole chemical class are multiplied by a factor of 0.2 (Neuhauser *et al.*, 1986). Value for dimethylphthalate used for phthalates.

[c] LC_{50} value for soil at pH = 7.0; LC_{50} = 320 ug/g - 560 ug/g for soil pH = 4.1.

[d] Acetate salt.

[e] Conservative factor of 0.2 applied to endpoint; resultant value should be protective of 99.9% of the exposed population from acute effects (USEPA, 1986).

Notes:

RTV = reference toxicity value.

NA = not available.

PCBs = polychlorinated biphenyls.

mg/kg = milligrams per kilogram.

LD_{50} = dose resulting in 50% mortality in test population.

References:

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TABLE H-6
ESTIMATION OF CHRONIC EXPOSURES TO TERRESTRIAL RECEPTORS FROM EXPOSURE TO RME CONCENTRATIONS IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT
Naval Air Station Whiting Field-Site 16

EXPOSURE CONCENTRATION DATA | **TISSUE LEVELS IN PRIMARY PREY ITEMS (Site Specific)**

CHEMICAL	REASONABLE MAXIMUM SOIL CONCENTRATION (mg/kg)	Invertebrate BAF [a]	Invertebrate Tissue Level (mg/kg) [b]	Plant BAF [a]	Plant Tissue Level (mg/kg) [b]	Mammal BAF [a]	Mammal Tissue Level (mg/kg) [c]	Bird BAF [a]	Small Bird Tissue Level (mg/kg) [c]
Benzo (a) anthracene	3.5E-01	5.0E-02	1.8E-02	3.4E-03	1.2E-03	9.5E-01	5.6E-03	NA	0.0E+00
Benzo (a) pyrene	3.7E-01	5.0E-02	1.9E-02	3.4E-03	1.3E-03	9.5E-01	5.9E-03	NA	0.0E+00
Benzo (b) fluoranthene	4.1E-01	5.0E-02	2.1E-02	3.4E-03	1.4E-03	9.5E-01	6.6E-03	NA	0.0E+00
Benzo (k) fluoranthene	3.9E-01	5.0E-02	1.9E-02	3.4E-03	1.3E-03	9.5E-01	6.2E-03	NA	0.0E+00
Benzo (g,h,i) perylene	3.0E-01	5.0E-02	1.5E-02	3.4E-03	1.0E-03	9.5E-01	4.8E-03	NA	0.0E+00
bis(2-Ethylhexyl) phthalate	1.2E-01	5.0E-02	5.9E-03	8.7E-03	1.0E-03	1.9E-01	4.1E-04	NA	0.0E+00
Carbazole	9.7E-02	5.0E-02	4.9E-03	5.2E-02	5.0E-03	1.5E-01	0.0E+00	NA	0.0E+00
Chrysene	3.9E-01	5.0E-02	1.9E-02	3.4E-03	1.3E-03	9.5E-01	6.2E-03	NA	0.0E+00
Dibenzo (a,h) anthracene	2.4E-01	5.0E-02	1.2E-02	3.4E-03	8.3E-04	9.5E-01	3.8E-03	NA	0.0E+00
Fluoranthene	3.4E-01	5.0E-02	1.7E-02	3.4E-03	1.2E-03	9.5E-01	5.5E-03	NA	0.0E+00
Indeno (1,2,3-cd) pyrene	3.2E-01	5.0E-02	1.6E-02	3.4E-03	1.1E-03	9.5E-01	5.2E-03	NA	0.0E+00
Phenanthrene	2.3E-01	5.0E-02	1.2E-02	3.4E-03	8.0E-04	9.5E-01	3.7E-03	NA	0.0E+00
Pyrene	3.1E-01	5.0E-02	1.6E-02	3.4E-03	1.1E-03	9.5E-01	5.0E-03	NA	0.0E+00
4,4-DDD	6.2E-03	3.3E+00	2.0E-02	1.0E-02	6.2E-05	1.2E+00	1.9E-03	2.9E+00	9.1E-04
4,4-DDE	3.7E-02	1.7E+00	6.3E-02	1.0E-02	3.7E-04	1.2E+00	6.3E-03	2.9E+00	2.8E-03
4,4-DDT	2.0E-02	5.7E-01	1.1E-02	1.0E-02	2.0E-04	1.2E+00	1.4E-03	2.9E+00	5.5E-04
Aroclor-1254	6.8E-02	5.8E+00	3.9E-01	1.2E-01	8.2E-03	3.8E+00	1.2E-01	3.2E-01	1.9E-03
Dieldrin	3.2E-02	5.5E+00	1.7E-01	1.7E-02	5.4E-04	1.5E+00	2.0E-02	4.4E-01	1.2E-03
Aluminum	1.1E+04	7.5E-02	8.5E+02	8.0E-04	9.0E+00	7.5E-02	1.5E+01	NA	0.0E+00
Arsenic	3.8E+00	6.6E-03	2.5E-02	3.0E-01	1.1E+00	1.0E-01	4.0E-02	6.0E-03	5.2E-05
Barium	6.3E+01	7.5E-03	4.8E-01	3.0E-02	1.9E+00	7.5E-03	1.0E-02	NA	0.0E+00
Cadmium	2.1E+00	1.1E+01	2.2E+01	3.3E+01	6.9E+01	2.1E+00	4.8E+01	3.8E-01	2.3E-01
Chromium	1.5E+01	1.6E-01	2.4E+00	1.5E-03	2.3E-02	2.8E-01	1.0E-01	2.8E-01	1.4E-02
Copper	7.8E+01	1.6E-01	1.3E+01	7.8E-01	6.1E+01	6.0E-01	1.2E+01	NA	0.0E+00
Lead	4.7E+02	7.8E-02	3.7E+01	0.0E+00	0.0E+00	1.5E-02	1.3E-01	NA	0.0E+00
Manganese	3.0E+02	2.0E-02	5.9E+00	5.0E-02	1.5E+01	2.0E-02	1.7E-01	NA	0.0E+00
Mercury	1.3E-01	6.8E-02	8.8E-03	1.8E-01	2.3E-02	1.0E-02	9.4E-05	2.3E+00	8.2E-04
Silver	2.3E+00	1.5E-01	3.5E-01	8.0E-02	1.8E-01	1.5E-01	1.6E-02	NA	0.0E+00
Vanadium	2.1E+01	1.2E-01	2.5E+00	1.1E-03	2.3E-02	1.2E-01	5.4E-02	NA	0.0E+00
Zinc	4.1E+02	1.8E+00	7.3E+02	6.1E-01	2.5E+02	2.1E+00	2.9E+02	NA	0.0E+00

[a] Bioaccumulation factors are presented in Appendix H, Table H-1

[b] Plant and invertebrate tissue concentrations are calculated by multiplying the soil concentration by the plant or invertebrate BAF.

[c] Mammal and bird tissue concentrations are calculated by multiplying the small mammal or bird body weight- and ingestion rate-normalized TBD by the mammal or bird BAF.

NA = Not analyzed

ND = Not detected

TBD = Total body dose

TABLE H-6
ESTIMATION OF CHRONIC EXPOSURES TO TERRESTRIAL RECEPTORS FROM EXPOSURE TO RME CONCENTRATIONS IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT
Naval Air Station Whiting Field-Site 16

TOTAL BODY DOSE (mg/kgBW-day) [a]

Chemical	Cotton mouse	Eastern Meadowlark	Short-tailed shrew	Great-horned owl	Red fox
Benzo (a) anthracene	9.2E-04	8.5E-05	7.2E-04	2.8E-06	3.6E-07
Benzo (a) pyrene	9.8E-04	9.0E-05	7.6E-04	2.9E-06	3.8E-07
Benzo (b) fluoranthene	1.1E-03	9.9E-05	8.4E-04	3.3E-06	4.2E-07
Benzo (k) fluoranthene	1.0E-03	9.4E-05	8.0E-04	3.1E-06	3.9E-07
Benzo (g,h,i) perylene	7.9E-04	7.2E-05	6.1E-04	2.4E-06	3.0E-07
bis(2-Ethylhexyl) phthalate	3.6E-04	2.9E-05	2.4E-04	5.2E-07	1.0E-07
Carbazole	6.4E-04	2.6E-05	2.1E-04	3.4E-07	9.0E-08
Chrysene	1.0E-03	9.4E-05	8.0E-04	3.1E-06	3.9E-07
Dibenzo (a,h) anthracene	6.3E-04	5.8E-05	4.9E-04	1.9E-06	2.4E-07
Fluoranthene	9.1E-04	8.3E-05	7.1E-04	2.7E-06	3.5E-07
Indeno (1,2,3-cd) pyrene	8.5E-04	7.8E-05	6.6E-04	2.6E-06	3.3E-07
Phenanthrene	6.1E-04	5.6E-05	4.8E-04	1.8E-06	2.4E-07
Pyrene	8.3E-04	7.6E-05	6.4E-04	2.5E-06	3.2E-07
4,4-DDD	2.1E-04	4.3E-05	2.4E-04	6.2E-07	1.1E-07
4,4-DDE	6.9E-04	1.3E-04	7.8E-04	2.1E-06	3.6E-07
4,4-DDT	1.6E-04	2.6E-05	1.6E-04	4.9E-07	7.6E-08
Aroclor-1254	4.5E-03	8.2E-04	4.6E-03	3.5E-05	3.1E-06
Dieldrin	1.7E-03	3.6E-04	2.0E-03	5.8E-06	9.7E-07
Aluminum	3.0E+01	3.3E+00	2.6E+01	4.3E-02	1.1E-02
Arsenic	1.0E-01	1.2E-03	7.9E-03	2.4E-05	5.2E-06
Barium	2.8E-01	1.1E-02	1.0E-01	2.2E-04	4.5E-05
Cadmium	5.9E+00	8.4E-02	3.8E-01	1.3E-02	7.9E-04
Chromium	5.3E-02	7.0E-03	5.0E-02	8.1E-05	2.0E-05
Copper	5.3E+00	7.0E-02	3.7E-01	3.7E-03	3.7E-04
Lead	1.2E+00	1.4E-01	1.1E+00	1.7E-03	4.4E-04
Manganese	1.8E+00	6.1E-02	5.3E-01	1.1E-03	2.4E-04
Mercury	2.3E-03	4.9E-05	3.3E-04	5.3E-07	1.7E-07
Silver	2.3E-02	1.1E-03	7.7E-03	1.3E-05	3.4E-06
Vanadium	6.5E-02	8.1E-03	6.0E-02	8.8E-05	2.4E-05
Zinc	2.8E+01	1.7E+00	9.4E+00	8.1E-02	7.1E-03

[a] Calculated by summing the products of individual prey type concentrations and percent in diet, multiplying by the SFF, exposure duration, and ingestion rate, and then dividing by body weight.

TABLE H-7

ESTIMATION OF CHRONIC EXPOSURES TO TERRESTRIAL RECEPTORS FROM EXPOSURE TO RME CONCENTRATIONS IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT
Naval Air Station Whiting Field-Site 16

EXPOSURE PARAMETERS [c]

Indicator Species		Percent Prey in Diet: Inverts	Plants	Small Mammals	Amphibians	Birds	Soil	Home Range (acres)	Site Foraging Frequency [d]	Dietary Ingestion Rate (kg/day)	Water Ingestion Rate (l/day)	Body Weight (kg)	Exposure Duration
Cotton mouse	Small herb. mammal	10%	88%	0%	0%	0%	2%	0.147	6.8E-01	0.0029	0.003	0.021	1
Eastern Meadowlark	Small omn. bird	75%	20%	0%	0%	0%	5%	5.0	2.0E-02	0.012	0.0115	0.087	1
Short-tailed shrew	Small omn. mammal	78%	12%	0%	0%	0%	10%	0.96	1.0E-01	0.002	0.0025	0.017	1
Great-horned owl	Predatory bird	0%	0%	80%	0%	19%	1%	15	6.7E-03	0.078	0.077	1.5	1
Red fox	Predatory mammal	20%	10%	57%	0%	10%	3%	250	4.0E-04	0.24	0.398	4.69	1

SITE AREA:	0.1	acres

NOTES:
[c] Documentation of exposure parameters presented in Table 7-7.
[d] Site Foraging Frequency (SFF). Calculated by dividing site area by receptor home range (cannot exceed 1.0)

TABLE H-8
RISK FROM POTENTIAL LETHAL EFFECTS FOR TERRESTRIAL RECEPTORS FROM RME CONCENTRATIONS
OF ECPCs IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT
Naval Air Station Whiting Field-Site 16

CHEMICAL	Cotton mouse Lethal			Eastern Meadowlark Lethal			Short-tailed shrew Lethal		
	TBD	RTV	HQ	TBD	RTV	HQ	TBD	RTV	HQ
Benzo (a) anthracene	9.2E-04	1.2E+01	7.7E-05	8.5E-05			7.2E-04	1.2E+01	6.0E-05
Benzo (a) pyrene	9.8E-04	1.2E+01	8.2E-05	9.0E-05			7.6E-04	1.2E+01	6.4E-05
Benzo (b) fluoranthene	1.1E-03	1.2E+01	9.0E-05	9.9E-05			8.4E-04	1.2E+01	7.0E-05
Benzo (k) fluoranthene	1.0E-03	1.2E+01	8.5E-05	9.4E-05			8.0E-04	1.2E+01	6.6E-05
Benzo (g,h,i) perylene	7.9E-04	1.2E+01	6.6E-05	7.2E-05			6.1E-04	1.2E+01	5.1E-05
bis(2-Ethylhexyl) phthalate	3.6E-04	1.6E+02	2.2E-06	2.9E-05			2.4E-04	1.6E+02	1.5E-06
Carbazole	6.4E-04	1.0E+02	6.4E-06	2.6E-05			2.1E-04	1.0E+02	2.1E-06
Chrysene	1.0E-03	1.2E+01	8.5E-05	9.4E-05			8.0E-04	1.2E+01	6.6E-05
Dibenzo (a,h) anthracene	6.3E-04	1.2E+01	5.3E-05	5.8E-05			4.9E-04	1.2E+01	4.1E-05
Fluoranthene	9.1E-04	4.0E+02	2.3E-06	8.3E-05			7.1E-04	4.0E+02	1.8E-06
Indeno (1,2,3-cd) pyrene	8.5E-04	1.2E+01	7.1E-05	7.8E-05			6.6E-04	1.2E+01	5.5E-05
Phenanthrene	6.1E-04	1.4E+02	4.4E-06	5.6E-05			4.8E-04	1.4E+02	3.4E-06
Pyrene	8.3E-04	1.6E+02	5.2E-06	7.6E-05			6.4E-04	1.6E+02	4.0E-06
4,4-DDD	2.1E-04	1.7E+01	1.2E-05	4.3E-05	1.2E+02	3.6E-07	2.4E-04	1.7E+01	1.4E-05
4,4-DDE	6.9E-04	1.4E+02	4.9E-06	1.3E-04	1.2E+02	1.1E-06	7.8E-04	1.4E+02	5.5E-06
4,4-DDT	1.6E-04	1.7E+01	9.2E-06	2.6E-05	1.2E+02	2.2E-07	1.6E-04	1.7E+01	9.2E-06
Aroclor-1254	4.5E-03	1.0E+02	4.5E-05	8.2E-04	1.6E+01	5.1E-05	4.6E-03	1.0E+02	4.6E-05
Dieldrin	1.7E-03	5.0E+00	3.5E-04	3.6E-04	1.2E+00	3.0E-04	2.0E-03	5.0E+00	4.1E-04
Aluminum	3.0E+01	7.4E+02	4.0E-02	3.3E+00			2.6E+01	7.4E+02	3.6E-02
Arsenic	1.0E-01	2.9E+01	3.5E-03	1.2E-03	3.6E+00	3.3E-04	7.9E-03	2.9E+01	2.7E-04
Barium	2.8E-01	4.3E+01	6.5E-03	1.1E-02			1.0E-01	4.3E+01	2.4E-03
Cadmium	5.9E+00	3.0E+01	2.0E-01	8.4E-02			3.8E-01	3.0E+01	1.3E-02
Chromium	5.3E-02	4.0E+01	1.3E-03	7.0E-03	2.6E+01	2.7E-04	5.0E-02	4.0E+01	1.2E-03
Copper	5.3E+00	1.9E+02	2.8E-02	7.0E-02			3.7E-01	1.9E+02	2.0E-03
Lead	1.2E+00	6.0E+01	2.1E-02	1.4E-01	7.5E+01	1.9E-03	1.1E+00	6.0E+01	1.9E-02
Manganese	1.8E+00	4.5E+01	4.1E-02	6.1E-02			5.3E-01	4.5E+01	1.2E-02
Mercury	2.3E-03	4.4E+00	5.1E-04	4.9E-05	4.0E+00	1.2E-05	3.3E-04	4.4E+00	7.6E-05
Silver	2.3E-02	6.8E+00	3.3E-03	1.1E-03			7.7E-03	6.8E+00	1.1E-03
Vanadium	6.5E-02	6.2E+00	1.1E-02	8.1E-03	1.9E+01	4.2E-04	6.0E-02	6.2E+00	9.7E-03
Zinc	2.8E+01	5.0E+02	5.7E-02	1.7E+00			9.4E+00	5.0E+02	1.9E-02
SUMMARY HAZARD INDEX			**4.1E-01**			**3.3E-03**			**1.2E-01**

TBD = Total Body Dose (mg/kgBW-day).
RTV = Reference Toxicity Value (mg/kgBW-day); wildlife RTVs are presented in Appendix F, Table F-9.
HQ = Hazard Quotient (calculated by dividing TBD by RTV)
NA = Not Available

TABLE H-8
RISK FROM POTENTIAL LETHAL EFFECTS FOR TERRESTRIAL RECEPTORS FROM RME CONCENTRATIONS
OF ECPCs IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT
Naval Air Station Whiting Field-Site 16

CHEMICAL	Great-horned owl Lethal TBD	RTV	HQ	Red fox Lethal TBD	RTV	HQ
Benzo (a) anthracene	2.8E-06			3.6E-07	1.2E+01	3.0E-08
Benzo (a) pyrene	2.9E-06			3.8E-07	1.2E+01	3.1E-08
Benzo (b) fluoranthene	3.3E-06			4.2E-07	1.2E+01	3.5E-08
Benzo (k) fluoranthene	3.1E-06			3.9E-07	1.2E+01	3.3E-08
Benzo (g,h,i) perylene	2.4E-06			3.0E-07	1.2E+01	2.5E-08
bis(2-Ethylhexyl) phthalate	5.2E-07			1.0E-07	1.6E+02	6.4E-10
Carbazole	3.4E-07			9.0E-08	1.0E+02	9.0E-10
Chrysene	3.1E-06			3.9E-07	1.2E+01	3.3E-08
Dibenzo (a,h) anthracene	1.9E-06			2.4E-07	1.2E+01	2.0E-08
Fluoranthene	2.7E-06			3.5E-07	4.0E+02	8.7E-10
Indeno (1,2,3-cd) pyrene	2.6E-06			3.3E-07	1.2E+01	2.7E-08
Phenanthrene	1.8E-06			2.4E-07	1.4E+02	1.7E-09
Pyrene	2.5E-06			3.2E-07	1.6E+02	2.0E-09
4,4-DDD	6.2E-07	1.2E+02	5.2E-09	1.1E-07	1.2E+01	9.4E-09
4,4-DDE	2.1E-06	1.2E+02	1.7E-08	3.6E-07	1.4E+02	2.6E-09
4,4-DDT	4.9E-07	1.2E+02	4.1E-09	7.6E-08	1.2E+01	6.4E-09
Aroclor-1254	3.5E-05	1.6E+01	2.2E-06	3.1E-06	1.5E+02	2.1E-08
Dieldrin	5.8E-06	1.2E+00	4.9E-06	9.7E-07	1.3E+01	7.5E-08
Aluminum	4.3E-02			1.1E-02	7.4E+02	1.4E-05
Arsenic	2.4E-05	3.6E+00	6.7E-06	5.2E-06	3.1E+00	1.7E-06
Barium	2.2E-04			4.5E-05	4.3E+01	1.0E-06
Cadmium	1.3E-02			7.9E-04	3.0E+01	2.6E-05
Chromium	8.1E-05	2.5E+01	3.2E-06	2.0E-05	4.0E+01	5.1E-07
Copper	3.7E-03			3.7E-04	1.9E+02	2.0E-06
Lead	1.7E-03	7.5E+01	2.2E-05	4.4E-04	6.0E+01	7.4E-06
Manganese	1.1E-03			2.4E-04	4.5E+01	5.3E-06
Mercury	5.3E-07	4.0E+00	1.3E-07	1.7E-07	4.4E+00	3.8E-08
Silver	1.3E-05			3.4E-06	6.8E+00	5.0E-07
Vanadium	8.8E-05	1.9E+01	4.6E-06	2.4E-05	6.2E+00	3.9E-06
Zinc	8.1E-02			7.1E-03	5.0E+02	1.4E-05
SUMMARY HAZARD INDEX			**4.4E-05**			**7.8E-05**

TBD = Total Body Dose (mg/kgBW-day).
RTV = Reference Toxicity Value (mg/kgBW-day); wildlife RTVs are presented in Appendix F, Table F-9.
HQ = Hazard Quotient (calculated by dividing TBD by RTV)
NA = Not Available

TABLE H-9
RISK FROM POTENTIAL SUBLETHAL EFFECTS FOR TERRESTRIAL RECEPTORS FROM RME CONCENTRATIONS
OF ECPCs IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT
Naval Air Station Whiting Field-Site 16

CHEMICAL	Cotton mouse Sublethal			Eastern Meadowlark Subletha			Short-tailed shrew Sublethal		
	TBD	RTV	HQ	TBD	RTV	HQ	TBD	RTV	HQ
Benzo (a) anthracene	9.2E-04	1.0E+01	9.2E-05	8.5E-05			7.2E-04	1.0E+01	7.2E-05
Benzo (a) pyrene	9.8E-04	1.0E+01	9.8E-05	9.0E-05			7.6E-04	1.0E+01	7.6E-05
Benzo (b) fluoranthene	1.1E-03	1.0E+01	1.1E-04	9.9E-05			8.4E-04	1.0E+01	8.4E-05
Benzo (k) fluoranthene	1.0E-03	1.0E+01	1.0E-04	9.4E-05			8.0E-04	1.0E+01	8.0E-05
Benzo (g,h,i) perylene	7.9E-04	1.0E+01	7.9E-05	7.2E-05			6.1E-04	1.0E+01	6.1E-05
bis(2-Ethylhexyl) phthalate	3.6E-04	3.5E+00	1.0E-04	2.9E-05			2.4E-04	3.5E+00	6.9E-05
Carbazole	6.4E-04			2.6E-05			2.1E-04		
Chrysene	1.0E-03	1.0E+01	1.0E-04	9.4E-05			8.0E-04	1.0E+01	8.0E-05
Dibenzo (a,h) anthracene	6.3E-04	1.0E+01	6.3E-05	5.8E-05			4.9E-04	1.0E+01	4.9E-05
Fluoranthene	9.1E-04	1.0E+01	9.1E-05	8.3E-05			7.1E-04	1.0E+01	7.1E-05
Indeno (1,2,3-cd) pyrene	8.5E-04	1.0E+01	8.5E-05	7.8E-05			6.6E-04	1.0E+01	6.6E-05
Phenanthrene	6.1E-04	1.0E+01	6.1E-05	5.6E-05			4.8E-04	1.0E+01	4.8E-05
Pyrene	8.3E-04	1.0E+01	8.3E-05	7.6E-05			6.4E-04	1.0E+01	6.4E-05
4,4-DDD	2.1E-04	2.0E-01	1.0E-03	4.3E-05	1.4E-01	3.1E-04	2.4E-04	2.0E-01	1.2E-03
4,4-DDE	6.9E-04	2.0E-01	3.5E-03	1.3E-04	3.9E-01	3.4E-04	7.8E-04	2.0E-01	3.9E-03
4,4-DDT	1.6E-04	2.0E-01	8.0E-04	2.6E-05	1.4E-01	1.9E-04	1.6E-04	2.0E-01	8.0E-04
Aroclor-1254	4.5E-03	1.5E-01	2.9E-02	8.2E-04	9.0E-02	9.1E-03	4.6E-03	1.5E-01	3.0E-02
Dieldrin	1.7E-03	6.5E-02	2.7E-02	3.6E-04			2.0E-03	6.5E-02	3.1E-02
Aluminum	3.0E+01	4.3E+02	7.0E-02	3.3E+00			2.6E+01	4.3E+02	6.2E-02
Arsenic	1.0E-01	5.8E-01	1.8E-01	1.2E-03	1.0E+00	1.2E-03	7.9E-03	5.8E-01	1.4E-02
Barium	2.8E-01	2.0E+01	1.4E-02	1.1E-02			1.0E-01	2.0E+01	5.2E-03
Cadmium	5.9E+00	2.2E+00	2.8E+00	8.4E-02	1.0E+00	8.4E-02	3.8E-01	2.2E+00	1.8E-01
Chromium	5.3E-02	3.5E+00	1.5E-02	7.0E-03	2.0E+02	3.5E-05	5.0E-02	3.5E+00	1.4E-02
Copper	5.3E+00	1.0E+01	5.3E-01	7.0E-02			3.7E-01	1.0E+01	3.7E-02
Lead	1.2E+00	3.0E+01	4.1E-02	1.4E-01	4.6E+00	3.0E-02	1.1E+00	3.0E+01	3.7E-02
Manganese	1.8E+00	1.4E+01	1.3E-01	6.1E-02			5.3E-01	1.4E+01	3.8E-02
Mercury	2.3E-03	5.0E-02	4.5E-02	4.9E-05	6.4E-02	7.6E-04	3.3E-04	5.0E-02	6.7E-03
Silver	2.3E-02			1.1E-03			7.7E-03		
Vanadium	6.5E-02	8.4E+00	7.8E-03	8.1E-03	1.1E+00	7.4E-03	6.0E-02	8.4E+00	7.2E-03
Zinc	2.8E+01	2.0E+01	1.4E+00	1.7E+00			9.4E+00	2.0E+01	4.7E-01
SUMMARY HAZARD INDEX			**5.3E+00**			**1.3E-01**			**9.4E-01**

TBD = Total Body Dose (mg/kgBW-day).
RTV = Reference Toxicity Value (mg/kgBW-day); wildlife RTVs are presented in Appendix F, Table F-9.
HQ = Hazard Quotient (calculated by dividing TBD by RTV)
NA = Not Available

TABLE H-9
RISK FROM POTENTIAL SUBLETHAL EFFECTS FOR TERRESTRIAL RECEPTORS FROM RME CONCENTRATIONS
OF ECPCs IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT
Naval Air Station Whiting Field-Site 16

CHEMICAL	Great-horned owl	Sublethal		Red fox	Sublethal	
	TBD	RTV	HQ	TBD	RTV	HQ
Benzo (a) anthracene	2.8E-06			3.6E-07	1.0E+01	3.6E-08
Benzo (a) pyrene	2.9E-06			3.8E-07	1.0E+01	3.8E-08
Benzo (b) fluoranthene	3.3E-06			4.2E-07	1.0E+01	4.2E-08
Benzo (k) fluoranthene	3.1E-06			3.9E-07	1.0E+01	3.9E-08
Benzo (g,h,i) perylene	2.4E-06			3.0E-07	1.0E+01	3.0E-08
bis(2-Ethylhexyl) phthalate	5.2E-07			1.0E-07	3.5E+00	2.9E-08
Carbazole	3.4E-07			9.0E-08		
Chrysene	3.1E-06			3.9E-07	1.0E+01	3.9E-08
Dibenzo (a,h) anthracene	1.9E-06			2.4E-07	1.0E+01	2.4E-08
Fluoranthene	2.7E-06			3.5E-07	1.0E+01	3.5E-08
Indeno (1,2,3-cd) pyrene	2.6E-06			3.3E-07	1.0E+01	3.3E-08
Phenanthrene	1.8E-06			2.4E-07	1.0E+01	2.4E-08
Pyrene	2.5E-06			3.2E-07	1.0E+01	3.2E-08
4,4-DDD	5.9E-07	1.4E-01	4.2E-06	1.1E-07	1.2E+01	9.3E-09
4,4-DDE	2.0E-06	3.9E-01	5.1E-06	3.6E-07	1.2E+01	3.0E-08
4,4-DDT	4.7E-07	1.4E-01	3.4E-06	7.6E-08	1.2E+01	6.3E-09
Aroclor-1254	3.5E-05	9.0E-01	3.9E-05	3.1E-06	9.6E-03	3.3E-04
Dieldrin	5.8E-06			9.7E-07	6.5E-02	1.5E-05
Aluminum	4.3E-02			1.1E-02	4.3E+02	2.5E-05
Arsenic	2.4E-05	1.0E+00	2.4E-05	5.2E-06	5.8E-01	9.0E-06
Barium	2.2E-04			4.5E-05	2.0E+01	2.3E-06
Cadmium	1.3E-02	1.0E+00	1.3E-02	7.9E-04	2.2E+00	3.7E-04
Chromium	8.1E-05	2.0E+02	4.0E-07	2.0E-05	3.5E+00	5.8E-06
Copper	3.7E-03			3.7E-04	1.0E+01	3.7E-05
Lead	1.7E-03	4.6E+00	3.6E-04	4.4E-04	3.0E+01	1.5E-05
Manganese	1.1E-03			2.4E-04	1.4E+01	1.7E-05
Mercury	5.0E-07	6.4E-02	7.9E-06	1.7E-07	5.0E-02	3.3E-06
Silver	1.3E-05			3.4E-06		
Vanadium	8.8E-05	1.1E+00	8.0E-05	2.4E-05	8.4E+00	2.9E-06
Zinc	8.1E-02			7.1E-03	2.0E+01	3.5E-04
SUMMARY HAZARD INDEX			**1.4E-02**			**1.2E-03**

TBD = Total Body Dose (mg/kgBW-day).
RTV = Reference Toxicity Value (mg/kgBW-day); wildlife RTVs are presented in Appendix F, Table F-9.
HQ = Hazard Quotient (calculated by dividing TBD by RTV)
NA = Not Available

TABLE H-10

ESTIMATION OF SUBCHRONIC EXPOSURES TO TERRESTRIAL RECEPTORS FROM EXPOSURE TO CT CONCENTRATIONS IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT

Naval Air Station Whiting Field-Site 16

EXPOSURE CONCENTRATION DATA / **TISSUE LEVELS IN PRIMARY PREY ITEMS (Site Specific)**

CHEMICAL	CENTRAL TENDENCY EXPOSURE CONCENTRATION (mg/kg)	Invertebrate BAF [a]	Invertebrate Tissue Level (mg/kg) [b]	Plant BAF [a]	Plant Tissue Level (mg/kg) [b]	Mammal BAF [a]	Mammal Tissue Level (mg/kg) [c]	Bird BAF [a]	Small Bird Tissue Level (mg/kg) [c]
Benzo (a) anthracene	2.9E-01	5.0E-02	1.4E-02	3.4E-03	9.8E-04	9.5E-01	4.6E-03	NA	0.0E+00
Benzo (a) pyrene	3.3E-01	5.0E-02	1.6E-02	3.4E-03	1.1E-03	9.5E-01	5.2E-03	NA	0.0E+00
Benzo (b) fluoranthene	3.7E-01	5.0E-02	1.8E-02	3.4E-03	1.3E-03	9.5E-01	5.9E-03	NA	0.0E+00
Benzo (k) fluoranthene	3.4E-01	5.0E-02	1.7E-02	3.4E-03	1.2E-03	9.5E-01	5.5E-03	NA	0.0E+00
Benzo (g,h,i) perylene	2.5E-01	5.0E-02	1.3E-02	3.4E-03	8.6E-04	9.5E-01	4.0E-03	NA	0.0E+00
bis(2-Ethylhexyl) phthalate	1.2E-01	5.0E-02	5.9E-03	8.7E-03	1.0E-03	1.9E-01	4.1E-04	NA	0.0E+00
Carbazole	9.7E-02	5.0E-02	4.9E-03	5.2E-02	5.0E-03	1.5E-01	0.0E+00	NA	0.0E+00
Chrysene	3.3E-01	5.0E-02	1.6E-02	3.4E-03	1.1E-03	9.5E-01	5.2E-03	NA	0.0E+00
Dibenzo (a,h) anthracene	2.1E-01	5.0E-02	1.1E-02	3.4E-03	7.3E-04	9.5E-01	3.4E-03	NA	0.0E+00
Fluoranthene	2.9E-01	5.0E-02	1.4E-02	3.4E-03	9.9E-04	9.5E-01	4.6E-03	NA	0.0E+00
Indeno (1,2,3-cd) pyrene	2.7E-01	5.0E-02	1.3E-02	3.4E-03	9.2E-04	9.5E-01	4.2E-03	NA	0.0E+00
Phenanthrene	2.0E-01	5.0E-02	9.8E-03	3.4E-03	6.7E-04	9.5E-01	3.1E-03	NA	0.0E+00
Pyrene	2.6E-01	5.0E-02	1.3E-02	3.4E-03	8.8E-04	9.5E-01	4.1E-03	NA	0.0E+00
4,4-DDD	4.4E-03	3.3E+00	1.5E-02	1.0E-02	4.4E-05	1.2E+00	1.4E-03	2.9E+00	6.4E-04
4,4-DDE	1.5E-02	1.7E+00	2.6E-02	1.0E-02	1.5E-04	1.2E+00	2.6E-03	2.9E+00	1.2E-03
4,4-DDT	1.1E-02	5.7E-01	6.2E-03	1.0E-02	1.1E-04	1.2E+00	7.5E-04	2.9E+00	3.0E-04
Aroclor-1254	4.6E-02	5.8E+00	2.7E-01	1.2E-01	5.5E-03	3.8E+00	8.4E-02	3.2E-01	1.3E-03
Dieldrin	1.5E-02	5.5E+00	8.1E-02	1.7E-02	2.5E-04	1.5E+00	9.5E-03	4.4E-01	5.4E-04
Aluminum	8.7E+03	7.5E-02	6.5E+02	8.0E-04	7.0E+00	7.5E-02	1.2E+01	NA	0.0E+00
Arsenic	2.8E+00	6.6E-03	1.8E-02	3.0E-01	8.4E-01	1.0E-01	2.9E-02	6.0E-03	3.9E-05
Barium	3.7E+01	7.5E-03	2.8E-01	3.0E-02	1.1E+00	7.5E-03	6.0E-03	NA	0.0E+00
Cadmium	1.2E+00	1.1E+01	1.3E+01	3.3E+01	4.0E+01	2.1E+00	2.7E+01	3.8E-01	1.3E-01
Chromium	1.1E+01	1.6E-01	1.7E+00	1.5E-03	1.6E-02	2.8E-01	7.2E-02	2.8E-01	1.0E-02
Copper	3.3E+01	1.6E-01	5.2E+00	7.8E-01	2.5E+01	6.0E-01	5.1E+00	NA	0.0E+00
Lead	1.1E+02	7.8E-02	8.6E+00	0.0E+00	0.0E+00	1.5E-02	2.9E-02	NA	0.0E+00
Manganese	1.3E+02	2.0E-02	2.6E+00	5.0E-02	6.5E+00	2.0E-02	7.4E-02	NA	0.0E+00
Mercury	1.0E-01	6.8E-02	6.8E-03	1.8E-01	1.8E-02	1.0E-02	7.2E-05	2.3E+00	6.3E-04
Silver	1.4E+00	1.5E-01	2.1E-01	8.0E-02	1.1E-01	1.5E-01	1.0E-02	NA	0.0E+00
Vanadium	1.6E+01	1.2E-01	1.9E+00	1.1E-03	1.7E-02	1.2E-01	4.0E-02	NA	0.0E+00
Zinc	1.0E+02	1.8E+00	1.8E+02	6.1E-01	6.3E+01	2.1E+00	7.2E+01	NA	0.0E+00

[a] Bioaccumulation factors are presented in Appendix H, Table H-1

[b] Plant and invertebrate tissue concentrations are calculated by multiplying the soil concentration by the plant or invertebrate BAF.

[c] Mammal and bird tissue concentrations are calculated by multiplying the small mammal or bird body weight- and ingestion rate-normalized TBD by the mammal or bird BAF.

NA = Not analyzed

ND = Not detected

TBD = Total body dose

TABLE H-10
ESTIMATION OF SUBCHRONIC EXPOSURES TO TERRESTRIAL RECEPTORS FROM EXPOSURE TO CT CONCENTRATIONS IN FOOD AND SURFACE SOI

REMEDIAL INVESTIGATION REPORT
Naval Air Station Whiting Field-Site 16

TOTAL BODY DOSE (mg/kgBW-day) [a]

Chemical	*Cotton mouse*	Eastern Meadowlark	Short-tailed shrew	Great-horned owl	Red fox
Benzo (a) anthracene	7.5E-04	6.9E-05	5.9E-04	2.3E-06	2.0E-05
Benzo (a) pyrene	8.6E-04	7.9E-05	6.7E-04	2.6E-06	2.3E-05
Benzo (b) fluoranthene	9.7E-04	8.9E-05	7.6E-04	2.9E-06	2.6E-05
Benzo (k) fluoranthene	9.0E-04	8.3E-05	7.0E-04	2.7E-06	2.4E-05
Benzo (g,h,i) perylene	6.6E-04	6.1E-05	5.1E-04	2.0E-06	1.8E-05
bis(2-Ethylhexyl) phthalate	3.6E-04	2.9E-05	2.4E-04	5.2E-07	7.1E-06
Carbazole	6.4E-04	2.6E-05	2.1E-04	3.4E-07	6.2E-06
Chrysene	8.6E-04	7.9E-05	6.7E-04	2.6E-06	2.3E-05
Dibenzo (a,h) anthracene	5.6E-04	5.1E-05	4.3E-04	1.7E-06	1.5E-05
Fluoranthene	7.6E-04	6.9E-05	5.9E-04	2.3E-06	2.0E-05
Indeno (1,2,3-cd) pyrene	7.0E-04	6.4E-05	5.5E-04	2.1E-06	1.9E-05
Phenanthrene	5.2E-04	4.7E-05	4.0E-04	1.5E-06	1.4E-05
Pyrene	6.7E-04	6.2E-05	5.2E-04	2.0E-06	1.8E-05
4,4-DDD	1.5E-04	3.0E-05	1.7E-04	4.4E-07	5.5E-06
4,4-DDE	2.8E-04	5.4E-05	3.1E-04	8.4E-07	1.0E-05
4,4-DDT	8.7E-05	1.4E-05	8.7E-05	2.6E-07	2.9E-06
Aroclor-1254	3.0E-03	5.6E-04	3.1E-03	2.4E-05	1.5E-04
Dieldrin	8.1E-04	1.7E-04	9.5E-04	2.7E-06	3.2E-05
Aluminum	2.3E+01	2.5E+00	2.0E+01	3.3E-02	5.7E-01
Arsenic	7.5E-02	8.8E-04	5.8E-03	1.8E-05	2.7E-04
Barium	1.6E-01	6.2E-03	5.9E-02	1.3E-04	1.8E-03
Cadmium	3.4E+00	4.8E-02	2.2E-01	7.6E-03	3.2E-02
Chromium	3.7E-02	4.9E-03	3.5E-02	5.8E-05	1.0E-03
Copper	2.2E+00	2.9E-02	1.5E-01	1.5E-03	1.1E-02
Lead	2.9E-01	3.3E-02	2.6E-01	3.9E-04	7.2E-03
Manganese	8.0E-01	2.6E-02	2.3E-01	4.7E-04	7.2E-03
Mercury	1.7E-03	3.7E-05	2.6E-04	4.1E-07	8.9E-06
Silver	1.4E-02	6.8E-04	4.7E-03	7.6E-06	1.4E-04
Vanadium	4.9E-02	6.1E-03	4.5E-02	6.6E-05	1.2E-03
Zinc	7.2E+00	4.3E-01	2.4E+00	2.0E-02	1.2E-01

[a] Calculated by summing the products of individual prey type concentrations and percent in diet, multiplying by the SFF, exposure duration, and ingestion rate, and then dividing by body weight.

TABLE H-11

ESTIMATION OF SUBCHRONIC EXPOSURES TO TERRESTRIAL RECEPTORS FROM EXPOSURE TO CT CONCENTRATIONS IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT
Naval Air Station Whiting Field-Site 16

EXPOSURE PARAMETERS [c]

Indicator Species		Percent Prey in Diet: Inverts	Plants	Small Mammals	Amphibians	Birds	Soil	Home Range (acres)	Site Foraging Frequency [d]	Dietary Ingestion Rate (kg/day)	Water Ingestion Rate (l/day)	Body Weight (kg)	Exposure Duration
Cotton mouse	Small herb. mammal	10%	88%	0%	0%	0%	2%	0.147	6.8E-01	0.0029	0.003	0.021	1
Eastern Meadowlark	Small omn. bird	75%	20%	0%	0%	0%	5%	5	2.0E-02	0.012	0.0115	0.087	1
Short-tailed shrew	Small omn. mammal	78%	12%	0%	0%	0%	10%	0.96	1.0E-01	0.002	0.0025	0.017	1
Great-horned owl	Predatory bird	0%	0%	80%	0%	19%	1%	15	6.7E-03	0.078	0.077	1.5	1
Red fox	Predatory mammal	20%	10%	57%	0%	10%	3%	250	2.8E-02	0.240	0.398	4.69	1

SITE AREA:	0.1	acres

NOTES:
[c] Documentation of exposure parameters presented in Table 9-8.
[d] Site Foraging Frequency (SFF). Calculated by dividing site area by receptor home range (cannot exceed 1.0)

TABLE H-12
RISK FROM POTENTIAL LETHAL EFFECTS FOR TERRESTRIAL RECEPTORS FROM CENTRAL TENDENCY EXPOSURE CONCENTRATIONS OF ECPCs IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT
Naval Air Station Whiting Field-Site 16

CHEMICAL	Cotton mouse			Eastern Meadowlark			Short-tailed shrew		
	Lethal			Lethal			Lethal		
	TBD	RTV	HQ	TBD	RTV	HQ	TBD	RTV	HQ
Benzo (a) anthracene	7.5E-04	1.2E+01	6.3E-05	6.9E-05			5.9E-04	1.2E+01	4.9E-05
Benzo (a) pyrene	8.6E-04	1.2E+01	7.2E-05	7.9E-05			6.7E-04	1.2E+01	5.6E-05
Benzo (b) fluoranthene	9.7E-04	1.2E+01	8.1E-05	8.9E-05			7.6E-04	1.2E+01	6.3E-05
Benzo (k) fluoranthene	9.0E-04	1.2E+01	7.5E-05	8.3E-05			7.0E-04	1.2E+01	5.9E-05
Benzo (g,h,i) perylene	6.6E-04	1.2E+01	5.5E-05	6.1E-05			5.1E-04	1.2E+01	4.3E-05
bis(2-Ethylhexyl) phthalate	3.6E-04	1.6E+02	2.2E-06	2.9E-05			2.4E-04	1.6E+02	1.5E-06
Carbazole	6.4E-04	1.0E+02	6.4E-06	2.6E-05			2.1E-04	1.0E+02	2.1E-06
Chrysene	8.6E-04	1.2E+01	7.2E-05	7.9E-05			6.7E-04	1.2E+01	5.6E-05
Dibenzo (a,h) anthracene	5.6E-04	1.2E+01	4.7E-05	5.1E-05			4.3E-04	1.2E+01	3.6E-05
Fluoranthene	7.6E-04	4.0E+02	1.9E-06	6.9E-05			5.9E-04	4.0E+02	1.5E-06
Indeno (1,2,3-cd) pyrene	7.0E-04	1.2E+01	5.8E-05	6.4E-05			5.5E-04	1.2E+01	4.5E-05
Phenanthrene	5.2E-04	1.4E+02	3.7E-06	4.7E-05			4.0E-04	1.4E+02	2.9E-06
Pyrene	6.7E-04	1.6E+02	4.2E-06	6.2E-05			5.2E-04	1.6E+02	3.3E-06
4,4-DDD	1.5E-04	1.7E+01	8.5E-06	3.0E-05	1.2E+02	2.6E-07	1.7E-04	1.7E+01	9.9E-06
4,4-DDE	2.8E-04	1.4E+02	2.0E-06	5.4E-05	1.2E+02	4.6E-07	3.1E-04	1.4E+02	2.2E-06
4,4-DDT	8.7E-05	1.7E+01	5.0E-06	1.4E-05	1.2E+02	1.2E-07	8.7E-05	1.7E+01	5.0E-06
Aroclor-1254	3.0E-03	1.0E+02	3.0E-05	5.6E-04	1.6E+01	3.5E-05	3.1E-03	1.0E+02	3.1E-05
Dieldrin	8.1E-04	5.0E+00	1.6E-04	1.7E-04	1.2E+00	1.4E-04	9.5E-04	5.0E+00	1.9E-04
Aluminum	2.3E+01	7.4E+02	3.1E-02	2.5E+00			2.0E+01	7.4E+02	2.7E-02
Arsenic	7.5E-02	2.9E+01	2.6E-03	8.8E-04	3.6E+00	2.4E-04	5.8E-03	2.9E+01	2.0E-04
Barium	1.6E-01	4.3E+01	3.8E-03	6.2E-03			5.9E-02	4.3E+01	1.4E-03
Cadmium	3.4E+00	3.0E+01	1.1E-01	4.8E-02			2.2E-01	3.0E+01	7.3E-03
Chromium	3.7E-02	4.0E+01	9.3E-04	4.9E-03	2.6E+01	1.9E-04	3.5E-02	4.0E+01	8.8E-04
Copper	2.2E+00	1.9E+02	1.2E-02	2.9E-02			1.5E-01	1.9E+02	8.1E-04
Lead	2.9E-01	6.0E+01	4.8E-03	3.3E-02	7.5E+01	4.4E-04	2.6E-01	6.0E+01	4.3E-03
Manganese	8.0E-01	4.5E+01	1.8E-02	2.6E-02			2.3E-01	4.5E+01	5.1E-03
Mercury	1.7E-03	4.4E+00	4.0E-04	3.7E-05	4.0E+00	9.4E-06	2.6E-04	4.4E+00	5.8E-05
Silver	1.4E-02	6.8E+00	2.0E-03	6.8E-04			4.7E-03	6.8E+00	6.9E-04
Vanadium	4.9E-02	6.2E+00	7.9E-03	6.1E-03	1.9E+01	3.2E-04	4.5E-02	6.2E+00	7.3E-03
Zinc	7.2E+00	5.0E+02	1.4E-02	4.3E-01			2.4E+00	5.0E+02	4.7E-03
SUMMARY HAZARD INDEX			**2.1E-01**			**1.4E-03**			**6.1E-02**

TBD = Total Body Dose (mg/kgBW-day).
RTV = Reference Toxicity Value (mg/kgBW-day); wildlife RTVs are presented in Appendix S, Table S-9.
HQ = Hazard Quotient (calculated by dividing TBD by RTV)
NA = Not Available

TABLE H-12
RISK FROM POTENTIAL LETHAL EFFECTS FOR TERRESTRIAL RECEPTORS FROM CENTRAL TENDENCY EXPOSURE CONCENTRATIONS OF ECPCs IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT
Naval Air Station Whiting Field-Site 16

CHEMICAL	Great-horned owl Lethal			Red fox Lethal		
	TBD	RTV	HQ	TBD	RTV	HQ
Benzo (a) anthracene	2.3E-06			2.0E-05	1.2E+01	1.7E-06
Benzo (a) pyrene	2.6E-06			2.3E-05	1.2E+01	1.9E-06
Benzo (b) fluoranthene	2.9E-06			2.6E-05	1.2E+01	2.2E-06
Benzo (k) fluoranthene	2.7E-06			2.4E-05	1.2E+01	2.0E-06
Benzo (g,h,i) perylene	2.0E-06			1.8E-05	1.2E+01	1.5E-06
bis(2-Ethylhexyl) phthalate	5.2E-07			7.1E-06	1.6E+02	4.5E-08
Carbazole	3.4E-07			6.2E-06	1.0E+02	6.2E-08
Chrysene	2.6E-06			2.3E-05	1.2E+01	1.9E-06
Dibenzo (a,h) anthracene	1.7E-06			1.5E-05	1.2E+01	1.2E-06
Fluoranthene	2.3E-06			2.0E-05	4.0E+02	5.1E-08
Indeno (1,2,3-cd) pyrene	2.1E-06			1.9E-05	1.2E+01	1.6E-06
Phenanthrene	1.5E-06			1.4E-05	1.4E+02	9.8E-08
Pyrene	2.0E-06			1.8E-05	1.6E+02	1.1E-07
4,4-DDD	4.4E-07	1.2E+02	3.7E-09	5.5E-06	1.2E+01	4.6E-07
4,4-DDE	8.4E-07	1.2E+02	7.0E-09	1.0E-05	1.4E+02	7.2E-08
4,4-DDT	2.6E-07	1.2E+02	2.2E-09	2.9E-06	1.2E+01	2.4E-07
Aroclor-1254	2.4E-05	1.6E+01	1.5E-06	1.5E-04	1.5E+02	9.8E-07
Dieldrin	2.7E-06	1.2E+00	2.3E-06	3.2E-05	1.3E+01	2.4E-06
Aluminum	3.3E-02			5.7E-01	7.4E+02	7.7E-04
Arsenic	1.8E-05	3.6E+00	4.9E-06	2.7E-04	3.1E+00	8.6E-05
Barium	1.3E-04			1.8E-03	4.3E+01	4.2E-05
Cadmium	7.6E-03			3.2E-02	3.0E+01	1.1E-03
Chromium	5.8E-05	2.5E+01	2.3E-06	1.0E-03	4.0E+01	2.5E-05
Copper	1.5E-03			1.1E-02	1.9E+02	5.6E-05
Lead	3.9E-04	7.5E+01	5.2E-06	7.2E-03	6.0E+01	1.2E-04
Manganese	4.7E-04			7.2E-03	4.5E+01	1.6E-04
Mercury	4.1E-07	4.0E+00	1.0E-07	8.9E-06	4.4E+00	2.0E-06
Silver	7.6E-06			1.4E-04	6.8E+00	2.1E-05
Vanadium	6.6E-05	1.9E+01	3.4E-06	1.2E-03	6.2E+00	2.0E-04
Zinc	2.0E-02			1.2E-01	5.0E+02	2.5E-04
SUMMARY HAZARD INDEX			**2.0E-05**			**2.8E-03**

TBD = Total Body Dose (mg/kgBW-day).
RTV = Reference Toxicity Value (mg/kgBW-day); wildlife RTVs are presented in Appendix S, Table S-9.
HQ = Hazard Quotient (calculated by dividing TBD by RTV)
NA = Not Available

TABLE H-13
RISK FROM POTENTIAL SUBLETHAL EFFECTS FOR TERRESTRIAL RECEPTORS FROM CENTRAL TENDENCY EXPOSURE CONCENTRATIONS OF ECPCs IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT
Naval Air Station Whiting Field-Site 16

CHEMICAL	Cotton mouse Sublethal			Eastern Meadowlark Sublethal			Short-tailed shrew Sublethal		
	TBD	RTV	HQ	TBD	RTV	HQ	TBD	RTV	HQ
Benzo (a) anthracene	7.5E-04	1.0E+01	7.5E-05	6.9E-05			5.9E-04	1.0E+01	5.9E-05
Benzo (a) pyrene	8.6E-04	1.0E+01	8.6E-05	7.9E-05			6.7E-04	1.0E+01	6.7E-05
Benzo (b) fluoranthene	9.7E-04	1.0E+01	9.7E-05	8.9E-05			7.6E-04	1.0E+01	7.6E-05
Benzo (k) fluoranthene	9.0E-04	1.0E+01	9.0E-05	8.3E-05			7.0E-04	1.0E+01	7.0E-05
Benzo (g,h,i) perylene	6.6E-04	1.0E+01	6.6E-05	6.1E-05			5.1E-04	1.0E+01	5.1E-05
bis(2-Ethylhexyl) phthalate	3.6E-04	3.5E+00	1.0E-04	2.9E-05			2.4E-04	3.5E+00	6.9E-05
Carbazole	6.4E-04			2.6E-05			2.1E-04		
Chrysene	8.6E-04	1.0E+01	8.6E-05	7.9E-05			6.7E-04	1.0E+01	6.7E-05
Dibenzo (a,h) anthracene	5.6E-04	1.0E+01	5.6E-05	5.1E-05			4.3E-04	1.0E+01	4.3E-05
Fluoranthene	7.6E-04	1.0E+01	7.6E-05	6.9E-05			5.9E-04	1.0E+01	5.9E-05
Indeno (1,2,3-cd) pyrene	7.0E-04	1.0E+01	7.0E-05	6.4E-05			5.5E-04	1.0E+01	5.5E-05
Phenanthrene	5.2E-04	1.0E+01	5.2E-05	4.7E-05			4.0E-04	1.0E+01	4.0E-05
Pyrene	6.7E-04	1.0E+01	6.7E-05	6.2E-05			5.2E-04	1.0E+01	5.2E-05
4,4-DDD	1.5E-04	2.0E-01	7.4E-04	3.0E-05	1.4E-01	2.2E-04	1.7E-04	2.0E-01	8.7E-04
4,4-DDE	2.8E-04	2.0E-01	1.4E-03	5.4E-05	3.9E-01	1.4E-04	3.1E-04	2.0E-01	1.6E-03
4,4-DDT	8.7E-05	2.0E-01	4.4E-04	1.4E-05	1.4E-01	1.0E-04	8.7E-05	2.0E-01	4.3E-04
Aroclor-1254	3.0E-03	1.5E-01	2.0E-02	5.6E-04	9.0E-02	6.2E-03	3.1E-03	1.5E-01	2.1E-02
Dieldrin	8.1E-04	6.5E-02	1.2E-02	1.7E-04			9.5E-04	6.5E-02	1.5E-02
Aluminum	2.3E+01	4.3E+02	5.4E-02	2.5E+00			2.0E+01	4.3E+02	4.8E-02
Arsenic	7.5E-02	5.8E-01	1.3E-01	8.8E-04	1.0E+00	8.8E-04	5.8E-03	5.8E-01	1.0E-02
Barium	1.6E-01	2.0E+01	8.2E-03	6.2E-03			5.9E-02	2.0E+01	3.0E-03
Cadmium	3.4E+00	2.2E+00	1.6E+00	4.8E-02	1.0E+00	4.8E-02	2.2E-01	2.2E+00	1.0E-01
Chromium	3.7E-02	3.5E+00	1.1E-02	4.9E-03	2.0E+02	2.5E-05	3.5E-02	3.5E+00	1.0E-02
Copper	2.2E+00	1.0E+01	2.2E-01	2.9E-02			1.5E-01	1.0E+01	1.5E-02
Lead	2.9E-01	3.0E+01	9.6E-03	3.3E-02	4.6E+00	7.1E-03	2.6E-01	3.0E+01	8.7E-03
Manganese	8.0E-01	1.4E+01	5.7E-02	2.6E-02			2.3E-01	1.4E+01	1.6E-02
Mercury	1.7E-03	5.0E-02	3.5E-02	3.7E-05	6.4E-02	5.9E-04	2.6E-04	5.0E-02	5.1E-03
Silver	1.4E-02			6.8E-04			4.7E-03		
Vanadium	4.9E-02	8.4E+00	5.8E-03	6.1E-03	1.1E+00	5.5E-03	4.5E-02	8.4E+00	5.4E-03
Zinc	7.2E+00	2.0E+01	3.6E-01	4.3E-01			2.4E+00	2.0E+01	1.2E-01
SUMMARY HAZARD INDEX			**2.5E+00**			**6.9E-02**			**3.8E-01**

TBD = Total Body Dose (mg/kgBW-day).
RTV = Reference Toxicity Value (mg/kgBW-day); wildlife RTVs are presented in Appendix S, Table S-9.
HQ = Hazard Quotient (calculated by dividing TBD by RTV)
NA = Not Available

TABLE H-13
RISK FROM POTENTIAL SUBLETHAL EFFECTS FOR TERRESTRIAL RECEPTORS FROM CENTRAL TENDENCY
EXPOSURE CONCENTRATIONS OF ECPCs IN FOOD AND SURFACE SOIL

REMEDIAL INVESTIGATION REPORT
Naval Air Station Whiting Field-Site 16

CHEMICAL	Great-horned owl Sublethal			Red fox Sublethal		
	TBD	RTV	HQ	TBD	RTV	HQ
Benzo (a) anthracene	2.3E-06			2.0E-05	1.0E+01	2.0E-06
Benzo (a) pyrene	2.6E-06			2.3E-05	1.0E+01	2.3E-06
Benzo (b) fluoranthene	2.9E-06			2.6E-05	1.0E+01	2.6E-06
Benzo (k) fluoranthene	2.7E-06			2.4E-05	1.0E+01	2.4E-06
Benzo (g,h,i) perylene	2.0E-06			1.8E-05	1.0E+01	1.8E-06
bis(2-Ethylhexyl) phthalate	5.2E-07			7.1E-06	3.5E+00	2.0E-06
Carbazole	3.4E-07			6.2E-06		
Chrysene	2.6E-06			2.3E-05	1.0E+01	2.3E-06
Dibenzo (a,h) anthracene	1.7E-06			1.5E-05	1.0E+01	1.5E-06
Fluoranthene	2.3E-06			2.0E-05	1.0E+01	2.0E-06
Indeno (1,2,3-cd) pyrene	2.1E-06			1.9E-05	1.0E+01	1.9E-06
Phenanthrene	1.5E-06			1.4E-05	1.0E+01	1.4E-06
Pyrene	2.0E-06			1.8E-05	1.0E+01	1.8E-06
4,4-DDD	4.4E-07	1.4E-01	3.1E-06	5.5E-06	1.2E+01	4.6E-07
4,4-DDE	8.4E-07	3.9E-01	2.1E-06	1.0E-05	1.2E+01	8.5E-07
4,4-DDT	2.6E-07	1.4E-01	1.9E-06	2.9E-06	1.2E+01	2.4E-07
Aroclor-1254	2.4E-05	9.0E-01	2.6E-05	1.5E-04	9.6E-03	1.5E-02
Dieldrin	2.7E-06			3.2E-05	6.5E-02	4.9E-04
Aluminum	3.3E-02			5.7E-01	4.3E+02	1.3E-03
Arsenic	1.8E-05	1.0E+00	1.8E-05	2.7E-04	5.8E-01	4.6E-04
Barium	1.3E-04			1.8E-03	2.0E+01	9.1E-05
Cadmium	7.6E-03	1.0E+00	7.6E-03	3.2E-02	2.2E+00	1.5E-02
Chromium	5.8E-05	2.0E+02	2.9E-07	1.0E-03	3.5E+00	2.8E-04
Copper	1.5E-03			1.1E-02	1.0E+01	1.1E-03
Lead	3.9E-04	4.6E+00	8.4E-05	7.2E-03	3.0E+01	2.4E-04
Manganese	4.7E-04			7.2E-03	1.4E+01	5.2E-04
Mercury	4.1E-07	6.4E-02	6.4E-06	8.9E-06	5.0E-02	1.8E-04
Silver	7.6E-06			1.4E-04		
Vanadium	6.6E-05	1.1E+00	6.0E-05	1.2E-03	8.4E+00	1.5E-04
Zinc	2.0E-02			1.2E-01	2.0E+01	6.2E-03
SUMMARY HAZARD INDEX			**7.8E-03**			**4.1E-02**

TBD = Total Body Dose (mg/kgBW-day).
RTV = Reference Toxicity Value (mg/kgBW-day); wildlife RTVs are presented in Appendix S, Table S-9.
HQ = Hazard Quotient (calculated by dividing TBD by RTV)
NA = Not Available

APPENDIX I

AQUIRE DATA

AQUIRE Freshwater Toxicity Information (µg/L)
Site 16

Remedial Investigation
NAS Whiting Field
Milton, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration Lethal	Effect Concentration Sublethal	AQUIRE Reference Number	Year of Publication
Inorganics								
Aluminum	Brachionus calyciflorus; Rotifer;	NEONATE	24 H	LC_{50}	> 3,000		219385	91
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}GR		12,700	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}BM *		7,600	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}BM *		2,500	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}GR		5,100	212262	74
	Salmo trutta; Brown trout;	ALEVIN	28 D	LC_{50}	19		213472	90
	Salmo trutta; Brown trout;	ALEVIN	42 D	LC_{50}	72		213472	90
	Salmo trutta; Brown trout;	ALEVIN	21 D	LC_{50}	84 to 105		213472	90
	Salmo trutta; Brown trout;	ALEVIN	42 D	LC_{50}	15		213472	90
	Salmo trutta; Brown trout;	ALEVIN	28 D	LC_{50}	79		213472	90
	Salmo trutta; Brown trout;	FERT EGG	<4 MO	HAT		<677	213472	90
	Salvelinus fontinalis; Brook trout;	FRY	43.2 H	LC_{50}	1,000		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	7.3 D	LC_{50}	630		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	79.2 H	LC_{50}	500		216632	80
	Salvelinus fontinalis; Brook trout;	ADULT, 25-30 CM	5 D	LET	320		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	86.4 H	LT_{50}	1,000		216632	80
	Salvelinus fontinalis; Brook trout;	FRY	11.5 D	LT_{50}	100		216632	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	10.67 D	LT_{50}	480		216188	80
	Salvelinus fontinalis; Brook trout;	FRY	4.7 D	LT_{50}	650		216632	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	19.67 D	LT_{50}	470		216188	80
	Salvelinus fontinalis; Brook trout;	FRY	5 D	LT_{50}	1,000		216632	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	20.83 D	LT_{50}	20		216188	80
	Salvelinus fontinalis; Brook trout;	FRY	50.4 H	LT_{50}	500		216632	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	4.79 D	LT_{50}	42		216188	80
	Salvelinus fontinalis; Brook trout;	FRY	67.2 H	LT_{50}	500		216632	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	8.42 D	LT_{50}	500		216188	80
	Salvelinus fontinalis; Brook trout;	EYED EGGS	5 D	MOR *	320		216632	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	>20.83 D	LT_{50}	10		216188	80
	Salvelinus fontinalis; Brook trout;	0.2 G, 30 D	3 D	GRO *		268	213592	91
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	>20.83 D	LT_{50}	500		216188	80
	Salvelinus fontinalis; Brook trout;	FRY	55.2 H	LT_{50}	500		216632	80
	Salvelinus fontinalis; Brook trout;	FRY, 22-23 MM	>20.83 D	LT_{50}	500		216188	80
	Salvelinus fontinalis; Brook trout;	FRY	38.4 H	LT_{50}	500		216632	80
	Salvelinus fontinalis; Brook trout;	0.2 G, 30 D	56 D	MOR *	268		213592	91
	Salvelinus fontinalis; Brook trout;	FRY	5.2 D	LT_{50}	100		216632	80
	Salvelinus fontinalis; Brook trout;	RECENTLY HATCHED FRY	5 D	LET	320		216632	80

Table I-1
AQUIRE Freshwater Toxicity Information (µg/L)
Site 16

Remedial Investigation
NAS Whiting Field
Milton, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration Lethal	Effect Concentration Sublethal	AQUIRE Reference Number	Year of Publication
	Salvelinus fontinalis; Brook trout;	YEARLINGS, 13-17 CM	5 D	LET	320		216632	80
Aluminum chloride	Ambystoma opacum; Marbled salamander;	EGGS	8 D	LC_{50}	2,280		216199	78
	Brachydanio rerio; Zebra danio, zebrafish;	LARVAE, 7-8 D POST-SPAWN	48 H	LC_{50}	106,000		311199	85
	Brachydanio rerio; Zebra danio, zebrafish;	LARVAE, 7-8 D POST-SPAWN	48 H	LC_{50}	80,000		311199	85
	Carassius auratus; Goldfish;	EGGS	7 D	LC_{50}	150		215305	78
	Chilomonas paramecium; Cryptomonad;	NR	0.17 H	LET	2,400		212863	73
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	24 H	MOR *	8,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	48 H	MOR *	2,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	24 H	MOR *	4,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	48 H	MOR *	2,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	24 H	MOR *	8,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	48 H	MOR *	8,000		315166	81
	Daphnia magna; Water flea;	12 H	21 D	EC_{50}IM ?		1,400	212022	72
	Daphnia magna; Water flea;	4 H	64 H	EC_{50}IM		1,400	212054	48
	Daphnia magna; Water flea;	12 H	48 H	EC_{50}IM ?		3,900	212022	72
	Daphnia magna; Water flea;	12 H	21 D	EC_{50}RE ?		680	212022	72
	Euglena gracilis; Flagellate euglenoid;	NR	3 H	MOR *	1,000,000		212863	73
	Gambusia affinis; Mosquitofish; Poeciliidae;	ADULT, FEMALE	48 H	LC_{50}	27,500		210508	57
	Gambusia affinis; Mosquitofish; Poeciliidae;	ADULT, FEMALE	24 H	LC_{50}	29,600		210508	57
	Gambusia affinis; Mosquitofish; Poeciliidae;	ADULT, FEMALE	96 H	LC_{50}	27,100		210508	57
	Gambusia affinis; Mosquitofish; Poeciliidae;	ADULT, FEMALE	96 H	MOR * (Calc)	20,400		210508	57
	Microhyla carolinensis; Narrow mouthed frog;	EGGS	7 D	LC_{50}	50		215305	78
	Micropterus salmoides; Largemouth bass;	EGGS	8 D	LC_{50}	170		216199	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EGGS	28 D	LC_{50}	560		215305	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 WK	9.25 D	PHY *		5,140; 1,570	218830	73
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	EGGS	28 D	LC_{50}	560		216199	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 MO	45 D	PHY *		514; 514	218830	73
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 11 WK	43.9 D	LC_{50}	513		219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 WK	4.7 D	PHY *		5,200; 5,050	218830	73
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 MO	31.96 D	LT_{50}	5,230		219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 WK	7.46 D	LT_{50}	5,140		219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 MO	45 D	GRO *		51.6; 51 6	218830	73
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 WK	71.52 H	LT_{50}	5,200		219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 11 WK	45 D	GRO *		513	219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 MO	45 D	GRO *		514	219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 6 MO	45 D	GRO *		51.6	219328	71
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 11 WK	38.9 D	LT_{50}	5,140		219328	71
	Peranema trichophorum; Flagellate;	NR	0.17 H	LET	>1,000,000		212863	73

Table I-1
AQUIRE Freshwater Toxicity Information (µg/L)
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Remedial Investigation
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Chemical Name	Species	Age	Exposure	Effect	Effect Concentration Lethal	Effect Concentration Sublethal	AQUIRE Reference Number	Year of Publication
	Pimephales promelas; Fathead minnow;	LARVAE, <24 H	14 D	GRO *		66; 35	213070	89
	Pimephales promelas; Fathead minnow;	EMBRYO	4 D	HAT *		66; 35	213070	89
	Pimephales promelas; Fathead minnow;	30 D	to 109 D	HIS		30 to 60	213182	90
	Pimephales promelas; Fathead minnow;	12 D LARVAE	to 96 H	MOR	50 to 400		210836	89
	Pimephales promelas; Fathead minnow;	JUVENILE	to 96 H	MOR	50 to 400		210836	89
	Pimephales promelas; Fathead minnow;	1 D LARVAE	to 96 H	MOR	50 to 400		210836	89
	Pimephales promelas; Fathead minnow;	LARVAE, <24 H	14 D	MOR *	66; 35		213070	89
	Pimephales promelas; Fathead minnow;	ADULT	2 MO	REP *		66; 35	213070	89
	Tetrahymena pyriformis; Ciliate;	NR	0.17 H	LET	3,200		212863	73
	Tropisternus lateralis; Beetle;	ADULT	14 D	PHY * (Calc)		27,000	212868	69
Aluminum sulfate	Asellus aquaticus; Aquatic sowbug;	ADULT, 7 MM, 1.5 MG DRY WT	48 H	EC_{50}IM ?		6,570	311972	86
	Asellus aquaticus; Aquatic sowbug;	ADULT, 7 MM, 1.5 MG DRY WT	72 H	EC_{50}IM ?		4,370	311972	86
	Biomphalaria glabrata; Snail;	ADULT, 4-4.5 SUTURE WHORL	24 H	STR *		100	212853	63
	Biomphalaria glabrata; Snail;	ADULT, 4-4.5 SUTURE WHORL	24 H	STR *		1,000	212853	63
	Cladocera; Water flea order;	NR	2 MO *	POP *		500	217183	78
	Crangonyx pseudogracilis; Amphipod;	ADULT, 4 MM, 0.2 MG DRY WT	48 H	EC_{50}IM ?		12,800	311972	86
	Crangonyx pseudogracilis; Amphipod;	ADULT, 4 MM, 0.2 MG DRY WT	96 H	EC_{50}IM ?		9,190	311972	86
	Crustacea; Crustacean class;	NR	2 MO *	ABD *		500	217183	78
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	24 H	MOR *	8,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	24 H	MOR *	8,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	48 H	MOR *	2,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	48 H	MOR *	4,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	48 H	MOR *	4,000		315166	81
	Cyprinus carpio; Common, mirror, colored, carp;	7.5-8.5 CM, 10.5-12.5 G	48 H	MOR *	8,000		315166	81
	Daphnia magna; Water flea;	8 H, YOUNG	0.25 H *	LOC *		136,000	212171	44
	Fundulus heteroclitus; Mummichog;	NR	36 H	LC_{100} (Calc)	2,200		212865	15
	Fundulus heteroclitus; Mummichog;	NR	5 D	LC_{100} (Calc)	1,100		212865	15
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	24 H	LC_{50}	69,000		210508	57
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	48 H	LC_{50}	38,000		210508	57
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	48 H	MOR * (Calc)	< 28,000		210508	57
	Gambusia affinis; Mosquitofish;	ADULT, FEMALE	96 H	LC_{50} ? (Calc)	37,000		210508	57
	Micropterus dolomieui; Smallmouth bass;	13.8(12-17) MM, 32.5(9-59) MG	30 D	GRO *		251.6	312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE	30 D	MOR *	251.6		312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE, 48 H POST-HATCH	96 H	MOR *	100		312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE, 48 H POST-HATCH	96 H	MOR *	196		312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE, 48 H POST-HATCH	96 H	MOR *	217		312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE, 48 H POST-HATCH	96 H	MOR *	32		312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE, 48 H POST-HATCH	96 H	MOR *	320		312723	87

Table I-1
AQUIRE Freshwater Toxicity Information (µg/L)
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Chemical Name	Species	Age	Exposure	Effect	Effect Concentration Lethal	Effect Concentration Sublethal	AQUIRE Reference Number	Year of Publication
	Micropterus dolomieui; Smallmouth bass;	LARVAE, 48 H POST-HATCH	96 H	MOR *	56		312723	87
	Micropterus dolomieui; Smallmouth bass;	LARVAE, 48 H POST-HATCH	96 H	MOR *	560		312723	87
	Notemigonus crysoleucas; Golden shiner;	NR	45 D	MOR *	100,000		312756	86
	Notemigonus crysoleucas; Golden shiner;	NR	45 D	MOR *	100,000		312756	86
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	24 H	MOR *	910		212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	24 H	MOR *	9,100		212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	48 H	LET	9,100		212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	48 H	MOR *	910		212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	72 H	MOR *	910		212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	96 H	HEM *		90	212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	96 H	HEM *		910	212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	96 H	HEM *		910	212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	96 H	MOR *	90		212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	118-355 G, 22-31 CM FORK LENGTH	96 H	MOR *	910		212508	88
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	50-80 MM	10 D	LC_0	200,000		216520	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	50-80 MM	10 D	LC_0	50,000		216520	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	50-80 MM	42 H	LC_{100}	50,000		216520	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	50-80 MM	42 H	LC_{100}	50,000		216520	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	50-80 MM	96 H	MOR *	50,000		216520	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING, 11 WK	45 D	PHY *		513	218830	73
	Salvelinus fontinalis; Brook trout;	14 MO, 210 MM, 130 G	24 H	LC_{50} ?	4,000		216115	75
	Salvelinus fontinalis; Brook trout;	14 MO, 210 MM, 130 G	24 H	LC_{50} ?	4,450		216115	75
	Salvelinus fontinalis; Brook trout;	14 MO, 210 MM, 130 G	24 H	MOR *	5,000		216115	75
	Salvelinus fontinalis; Brook trout;	14 MO, 210 MM, 130 G	24 H	MOR *	5,000		216115	75
	Salvelinus fontinalis; Brook trout;	14 MONTHS, 210 MM, 130 G	96 H	LC_{50} ?	3,600		216115	75
	Salvelinus fontinalis; Brook trout;	EYED EMBRYO - LARVAE	45 D	GRO *		283	312720	87
	Salvelinus fontinalis; Brook trout;	EYED EMBRYO - LARVAE	60 D	BEH *		283	312720	87
	Salvelinus fontinalis; Brook trout;	EYED EMBRYO - LARVAE	60 D	MOR *	283		312720	87
	Stizostedion lucioperca; Pikeperch;	11.5-16 MM	24 H	MOR *	400		212700	75
Barium	Daphnia magna; Water flea;	<= 24 H	24 H	LC_{50}	> 530,000		215184	80
	Daphnia magna; Water flea;	<= 24 H	48 H	LC_{50}	410,000		215184	80
	Daphnia magna; Water flea;	<= 24 H	48 H	MOR *	68,000		215184	80
	Lemna minor; Duckweed;	20 COLONIES OR 40 FRONDS	4 D	EC_{50}GR		26,000	311789	86
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}BM *		103,000	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}BM *		41,200	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50} GR		113,000	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50} GR		83,800	212262	74

AQUIRE Freshwater Toxicity Information (µg/L)
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Chemical Name	Species	Age	Exposure	Effect	Effect Concentration Lethal	Effect Concentration Sublethal	AQUIRE Reference Number	Year of Publication
Barium chloride	Austropotamobius pallipes pall; Crayfish	19-32 MM	96 H	LC_{50}	46,000		228813	73
	Daphnia magna; Water flea	12 H	21 D	REP		8,900	228734	72
	Daphnia magna; Water flea	12 H	48 H	IMM		14,500	228732	72
	Echinogammarus berilloni; Scud	NR	24 H	LC_{50}	336,000		307710	86
	Gambusia affinis; Mosquitofish	ADULT, FEMALE	96 H	MOR	66,200		215457	57
	Gambusia affinis; Mosquitofish	ADULT, FEMALE	24 H	LC_{50}	2,910,000		215454	57
	Gammarus pulex; Scud	NR	24 H	LC_{50}	3,980,000		307706	86
	Lemna minor; Duckweed	FRONDS	96 H	GRO		25,000	283261	88
	Orconectes limosus; Crayfish	19-32 MM	96 H	LC_{50}	78,000		228816	73
	Salmo trutta; Brown trout	YEARLING	48 H	LC_{50}	150,000		240072	74
Lead	Astacus astacus; European crayfish;	8-10 CM	2 WK	ENZ *		20	210376	91
	Astacus astacus; European crayfish;	8-10 CM	to 10 WK	HIS		20	210376	91
	Barbus arulius; Barb;	1.24 G	4 D	HIS		200,000 to 400,000	219972	87
	Brachionus calyciflorus; Rotifer;	NEONATE	24 H	LC_{50}	> 4,000		219385	91
	Brachydanio rerio; Zebra danio, zebrafish;	DECHLORIONATED EGG	24 H			72	219870	80
	Brachydanio rerio; Zebra danio, zebrafish;	EGG	48 H			72	219870	80
	Bufo arenarum; Toad;	EMBRYO	24 H	DVP *		1,000	213162	90
	Bufo arenarum; Toad;	EMBRYO	24 H	MOR *	1,000		213162	90
	Carassius auratus; Goldfish;	UNDERYEARLING	1 WK *	ENZ *		470	315460	77
	Ceriodaphnia reticulata; Water flea;	< 4 H	48 H	LC_{50}	530		311181	84
	Daphnia magna; Water flea;	< 24 H	48 H	LC_{50}	4,400		311181	84
	Daphnia pulex; Water flea;	< 24 H	48 H	LC_{50}	5,100		311181	84
	Dugesia dorotocephala; Turbellarian, flatworm;	18-20 MM	1 H	BEH *		100 to 1,000	310581	91
	Dugesia tigrina; Turbellarian, flatworm;	NR	96 H	LC_{50}	160,000		218709	74
	Hyalella azteca; Scud;	NR	5 D	LC_{100}	5,000		219804	80
	Lemna minor; Duckweed;	20 COLONIES OR 40 FRONDS	4 D	EC_{50}GR		8,000	311789	86
	Lepomis gibbosus; Pumpkinseed;	> 1.75 YR	<=2 WK *	ENZ *		90	315460	77
	Micropterus dolomieui; Smallmouth bass;	EGG	96 H	MOR *	<=15,900		312153	86
	Micropterus dolomieui; Smallmouth bass;	FINGERLING	10 WK	LOC *		405	312153	86
	Micropterus dolomieui; Smallmouth bass;	FINGERLING	90 D	GRO *		405	312153	86
	Micropterus dolomieui; Smallmouth bass;	FINGERLING	90 D	HEM *		405	312153	86
	Micropterus dolomieui; Smallmouth bass;	FINGERLING	96 H	LC_{50}	29,000		312153	86
	Micropterus dolomieui; Smallmouth bass;	SAC FRY, 7 D POST-SPAWN	96 H	MOR *	<=15,900		312153	86
	Micropterus dolomieui; Smallmouth bass;	SWIM-UP FRY, 17 D POST-SPAWN	96 H	LC_{50}	2,800		312153	86
	Micropterus dolomieui; Smallmouth bass;	SWIM-UP, FRY 17 D POST-SPAWN	96 H	LC_{50}	2,200		312153	86
	Micropterus salmoides; Largemouth bass;	NR	24 H	BEH *		1,500	311127	78
	Micropterus salmoides; Largemouth bass;	NR	24 H	RES *		1,050	311127	78

Table I-1
AQUIRE Freshwater Toxicity Information (µg/L)
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Chemical Name	Species	Age	Exposure	Effect	Effect Concentration Lethal	Effect Concentration Sublethal	AQUIRE Reference Number	Year of Publication
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}BM *		363,000	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}BM *		808,000	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}GR		725,000	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}GR		767,000	212262	74
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	10.5 G	32 WK	HIS *			310573	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	15 G	24 H	HEM *		130	315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	110		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	120		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	120		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	210		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	300		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	470		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	490		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	500		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	52		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	53		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	740		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	80		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	85		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	900		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	4 MO, 15 G	4 to 72 H	MOR *	910		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	53 G	1 WK	MOR *	1,000		315719	78
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	6-18 MO	<=2 WK *	ENZ *		10	315460	77
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	6.5 G	30 WK	HIS *		120	310573	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NEWLY HAT, SAC FRY	189 D	ABN *		32	219830	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NEWLY HAT, SAC FRY	189 D	ENZ *		100	219830	80
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NEWLY HAT, SAC FRY	189 D	HEM *		100	219830	80
	Pimephales promelas; Fathead minnow;	JUVENILE	4 WK	PHY		500 to 1,000	210204	89
	Potamogeton crispus; Curled pondweed;	NR	NR	PSE *		25,000	217552	77
	Salvelinus fontinalis; Brook trout;	6-18 MO	<=2 WK *	ENZ *		90	315460	77
	Simocephalus vetulus; Water flea;	< 24 H	48 H	LC_{50}	4,500		311181	84
Manganese	Algae; Algae, phytoplankton, algal mat;	NATURAL COLONY	38 D	POP *		280	212862	69
	Anabolia nervosa; Quiver fly;	LARVAE	7 D	LET	2,000,000		210725	57
	Chironomus thummi; Midge;	LARVAE	7 D	LET	1,000,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	2.25 H	LET *	1,000,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	24 H	LET *	2,000,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	25 H	LET *	1,800,000		210725	57

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AQUIRE Freshwater Toxicity Information (µg/L)

Site 16

Remedial Investigation

NAS Whiting Field

Milton, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration Lethal	Effect Concentration Sublethal	AQUIRE Reference Number	Year of Publication
	Cyprinidae; Minnow, carp family;	1 SUMMER	4.17 D	LET *	800,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	5.13 D	LET *	700,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	6.63 D	LET *	650,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	7 D	MOR *	600,000		210725	57
	Cyprinidae; Minnow, carp family;	1 SUMMER	78 H	LET *	900,000		210725	57
	Cyprinidae; Minnow, carp family;	2 SUMMERS	48 H	LET *	2,000,000		210725	57
	Gammarus roeseli; Scud;	NR	7 D	LET	70,000		210725	57
	Lemna minor; Duckweed;	20 COLONIES OR 40 FRONDS	4 D	EC_{50}GR		31,000	311789	86
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	10 H	LET *	700,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	13 H	LET *	600,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	34 H	LET *	300,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	5 D	LET *	100,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	7 D	MOR *	75,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	1 SUMMER	77 H	LET *	150,000		210725	57
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	2 SUMMERS	34 H	LET *	600,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	15 H	LET *	700,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	23 H	LET *	600,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	4.79 D	LET *	150,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	66 H	LET *	300,000		210725	57
	Salvelinus fontinalis; Brook trout;	1 SUMMER	7 D	MOR *	100,000		210725	57
	Salvelinus fontinalis; Brook trout;	2 SUMMERS	41 H	LET *	600,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	48 H	LET *	2,000,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	6.75 D	LET *	1,500,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	7 D	MOR *	1,200,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	7 D	MOR *	1,300,000		210725	57
	Tinca tinca; Tench;	1 SUMMER	96 H	LET *	1,800,000		210725	57
	Tinca tinca; Tench;	2 SUMMERS	7 D	LET *	2,000,000		210725	57
	Tubifex tubifex; Tubificid worm;	NR	7 D	LET	700,000		210725	57
Zinc	Algae; Algae, phytoplankton, algal mat;	CLADOCERA, COPEPODA, ROTIFERA	2 WK	CLR *		15 to 30	311256	83
	Algae; Algae, phytoplankton, algal mat;	EXPO GRO PHASE	24 H	PSE		<=98100	213095	89
	Asellus communis; Aquatic sowbug;	NR	20 D	RSD *		0.11 to 0.12	312027	86
	Brachionus calyciflorus; Rotifer;	NEONATE	24 H	LC_{50}	1,300		219385	91
	Canthocamptus sp; Copepod;	LARVAE	24 H	LET	1,250		311797	85
	Carassius auratus; Goldfish;	20-25 G	to 15 D	BIO *		500	219207	72
	Catostomus commersoni; White sucker;	JUVENILE, 142 MM, 28.7 G	1 WK	RSD		890	312412	87
	Ceriodaphnia reticulata; Water flea;	< 4 H	48 H	LC_{50}	76		311181	84
	Channa punctatus; Snake-head catfish;	2.4 G, 58 MM	24 H	ENZ *		56,000	315190	81

Table I-1
AQUIRE Freshwater Toxicity Information (µg/L)
Site 16

Remedial Investigation
NAS Whiting Field
Milton, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration Lethal	Effect Concentration Sublethal	AQUIRE Reference Number	Year of Publication
	Chironomidae; Midge family;	LARVAE	12 MO	POP		1,140	213176	88
	Chironomus riparius; Midge;	4TH INSTAR LARVAE	>10 D	RSD		50 to 100	212729	89
	Clarias lazera; Catfish;	IMMATURE, 12-15 G	2 to 96 H	BIO *		32,000	312716	87
	Clarias lazera; Catfish;	JUVENILE, 230 MM, 130 G	24 H	RSD *		15,000	312717	87
	Cyclops sp; Cyclopoid copepod;	ADULT	48 H	LC_{50}	3,310		313255	88
	Cypris subglobosa; Ostracod;	NR	12 H	LC_{50}	47,780		312365	88
	Cypris subglobosa; Ostracod;	NR	24 H	LC_{50}	50,620		312365	88
	Cypris subglobosa; Ostracod;	NR	48 H	LC_{50}	34,990		312365	88
	Cypris subglobosa; Ostracod;	NR	96 H	LC_{50}	8,352		312365	88
	Daphnia lumholzi; Water flea;	NR	12 H	LC_{50}	10,740		312365	88
	Daphnia lumholzi; Water flea;	NR	24 H	LC_{50}	6,704		312365	88
	Daphnia lumholzi; Water flea;	NR	48 H	LC_{50}	2,290		312365	88
	Daphnia lumholzi; Water flea;	NR	96 H	LC_{50}	437.5		312365	88
	Daphnia magna; Water flea;	24-48 HR, NEONATE	21 D	GRO *		150	213950	91
	Daphnia magna; Water flea;	24-48 HR, NEONATE	21 D	MOR	50 to 150		213950	91
	Daphnia magna; Water flea;	24-48 HR, NEONATE	21 D	REP *		150	213950	91
	Daphnia magna; Water flea;	< 24 H	48 H	LC_{50}	68		311181	84
	Daphnia pulex; Water flea;	< 24 H	48 H	LC_{50}	107		311181	84
	Dugesia dorotocephala; Turbellarian, flatworm;	18-20 MM	1 H	BEH *		1,000 to 10,000	310581	91
	Dugesia tigrina; Turbellarian, flatworm;	NR	96 H	LC_{50}	7,400		218709	74
	Gambusia affinis; Mosquitofish;	MIXED SIZES	to 30 D	RSD		50	312897	88
	Gambusia affinis; Mosquitofish;	NR	48 H	LC_{50} ?	116		315578	78
	Gammarus lacustris; Scud;	NR	96 H	LC_{50}	2,240		313058	88
	Gomphonema parvulum; Diatom;	MIXED SPECIES	to 28 D	ABD *		1,000	212397	84
	Hyphessobryoon serpae; Serpa tetra;	JUVENILE & OLDER FISH	14 D	RSD		66,000	212709	78
	Invertebrates; Invertebrates;	CLADOCERA, COPEPODA, ROTIFERA	2 WK	POP *		17.1 to 89.6	311256	83
	Invertebrates; Invertebrates;	CLADOCERA, COPEPODA, ROTIFERA	2 WK	POP *		30 to 90	311256	83
	Lemna minor; Duckweed;	20 COLONIES OR 40 FRONDS	4 D	EC_{50}GR		10,000	311789	86
	Lepomis gibbosus; Pumpkinseed;	15-25 G	to 15 D	BIO *		500	219207	72
	Lepomis macrochirus; Bluegill;	NR	6 MO	MOR *	5,000		212143	73
	Limnodrilus sp; Sludge worm;	NR	14 D	RSD		1,000	311865	83
	Lophopodella carteri; Bryozoa;	ANCENSTRULAE, 2-3 D	96 H	LC_{50}	5,630		216703	80
	Macrobrachium hendersodayanus; Prawn;	NR	96 H	OC *		7,870	311545	84
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}BM *		21,600	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}GR		20,900	212262	74
	Myriophyllum spicatum; Water-milfoil;	4 CM APEX	32 D	EC_{50}GR		21,600	212262	74
	Mystus vittatus; Catfish;	80-100 MM, 6-10 G	96 H	LC_{50} ?	209,000		315793	82
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	20-50 G	6 H	PHY *		2,000	311200	82

AQUIRE Freshwater Toxicity Information (µg/L)
Site 16

Remedial Investigation
NAS Whiting Field
Milton, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration Lethal	Effect Concentration Sublethal	AQUIRE Reference Number	Year of Publication
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	FINGERLING	12 D	RSD *		910 to 2,320	311689	86
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	JUVENILE	to 4 WK	BIO		44 to 140	310107	84
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	48 H	LC_{50}	2,600		310185	68
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	48 H	LC_{50}	2,800		218317	68
Zinc	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	NR	48 H	LC_{50}	3,500		218317	68
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	SAC-FRY	42 D	GRO *		430	310527	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	SAC-FRY	42 D	MOR *	120		310527	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	SAC-FRY	42 D	MOR *	430		310527	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	SAC-FRY	42 D	MOR * (Calc)	220		310527	83
	Oncorhynchus mykiss; Rainbow trout, donaldson trout;	SAC-FRY	42 D	MOR * (Calc)	80		310527	83
	Osteichthyes; Bony fish class;	ADULT GUPPY, 20-30 MM	48 H	LC_{50}	2,630		212882	88
	Osteichthyes; Bony fish class;	ADULT GUPPY, 20-30 MM	96 H	LC_{50}	1,860		212882	88
	Osteichthyes; Bony fish class;	JUVENILE GUPPY, 8-15 MM	48 H	LC_{50}	1,970		212882	88
	Osteichthyes; Bony fish class;	JUVENILE GUPPY, 8-15 MM	96 H	LC_{50}	1,360		212882	88
	Pectinatella magnifica; Bryozoa;	ANCENSTRULAE, 2-3 D	96 H	LC_{50}	4,310		216703	80
	Phaenopsectra sp; Chironomid;	MIXED SPECIES	to 28 D	ABD *		10,000	212397	84
	Pimephales promelas; Fathead minnow;	NEWLY HAT, < 24 H	7 D	GRO *		184	311182	85
	Pimephales promelas; Fathead minnow;	NEWLY HAT, < 24 H	7 D	GRO *		85	311182	85
	Pimephales promelas; Fathead minnow;	NEWLY HAT, < 24 H	7 D	LC_{50}	238		311182	85
	Pimephales promelas; Fathead minnow;	NEWLY HAT, < 24 H	96 H	LC_{50}	238		311182	85
	Pimephales promelas; Fathead minnow;	SUBADULT, 8-12 WK, <=250 MG	2 to 35 D	GRO *		600	210678	89
	Pimephales promelas; Fathead minnow;	SUBADULT, 8-12 WK, <=250 MG	96 H	LC_{50}	2,540		210678	89
	Plumatella emarginata; Bryozoan;	ANCENSTRULAE, 2-3 D	96 H	LC_{50}	5,300		216703	80
	Salmo trutta; Brown trout;	NR	2 to 40 D	RSD		366 to 832	311216	85
	Tilapia sparrmanii; Banded bream;	12.13-81.77 G	2 to 72 H	OC *		98,000	213066	89
	Tilapia zillii; Tilapia;	IMMATURE, 7-9 G	2 to 96 H	BIO *		22,000	312716	87
	Tubifex sp; Tubificid worm;	NR	14 D	RSD		1,000	311865	83

NOTES:

ABD = Abundance
ABN = Abnormalities
BCF = Bioconcentration factor
BEH = Behavioral change
BIO = Biochemical effect
BM = Biomass
BMS = Biomass
C = Celcius
G = Grams
GR = Growth
GRO = Growth
H = Hours
HAT = Hatchability
HEM = Hematological effect
HIS = Histological effect
IM = Immobilization
OC = Oxygen consumption
PGR = Population growth
PHY = Physiological effects
POP = Population, species diversity
PSE = Photosynthesis effect
RE = Reproduction
REP = Adverse effect to reproduction
RES = Respiratory effects

Table I-1
AQUIRE Freshwater Toxicity Information (μg/L)
Site 16

Remedial Investigation
NAS Whiting Field
Milton, Florida

Chemical Name	Species	Age	Exposure	Effect	Effect Concentration Lethal	Effect Concentration Sublethal	AQUIRE Reference Number	Year of Publication

CLR = Chlorophyll content	LC_{50} = Lethal concentration to 50% of test organisms	RN = Renewel
CM = Centimeter	LET = Lethality	RSD = Residue
D = Days	LOC = Locomotor Behaviour	ST = Static
EC_{50} = Effect of concentration to 50% of the population	LT_{50} = Lethal threshold to 50% of test organisms	STR = Stress
EMS = Emergance?	MM = Millimeter	THL = Thermal effect
ENZ = Enzyme effect	MOR = Mortality	VTE = Vertebral effect
F = Farenheit	NR = Not reported	μg/L = Microgram per liter

APPENDIX J

NAVY RESPONSE TO COMMENT

Response to Review Comments
Remedial Investigation Report
Site 16, Open disposal and Burning Area
NAS Whiting Field, Milton, Florida

Florida Department of Environmental Protection

1. All contaminant data should be evaluated using the ground water, surface water and soil MCLs and SCTLs in Chapter 62-785, F.A.C. Until then, all tables, conclusions and other determinations (especially soil) cannot be adequately reviewed. This comment applies to many tables in the report and in the Appendix. All existing tables should be reviewed for applicability. References to the Soil Cleanup Goals for Florida, 1995 and the associated Applicability of Soil Cleanup Goals for Florida, 1996, should be removed as well as those to the 1994 Ground Water Guidance Concentrations. This is especially important in Section 6.0, Human Health Risk Assessment.

   Response: Agree. All contaminant data will be evaluated using the values presented in Chapter 62-777, F.A.C. All references to the 1995 Florida Soil Cleanup Goals, the associated 1996 Applicability of Soil Cleanup Goals for Florida, and the 1994 Groundwater Guidance Concentrations will be deleted.

2. Soil contaminants should be evaluated with respect the leachability criteria in Table II of Chapter 62-785, F.A.C., including assessment of that possibility by use of the SPLP procedure in those instances where the leachability value may be exceeded. If the Navy intends to conduct the actual leaching evaluation from within the Basewide Groundwater Evaluation, it should so state; however, it seems to me that where such an evaluation may be needed, it should be stated in this report to properly document that need.

   Response: Agree. Soil contaminants will be evaluated with respect to the leachability criteria in Chapter 62-777, F.A.C. A statement indicating the Navy intends to conduct the actual leaching evaluation from within the Basewide Groundwater Evaluation will be added to the RI.

3. In the manner of Figure 5-7, please present other contaminant data, where they exceed either the Federal or Florida screening numbers, especially for surface soil, on a figure in order that an appraisal can be made of the adequacy of areal contaminant assessment. I am particularly concerned about the areas west of soil samples 16-SL-03, 16S002 and 16S004, in addition to those areas where a high contaminant value is the existing "outer" sampling point.

   Response: As suggested by the reviewer, contaminant data for soils will be included on a figure.

4. Please prepare a table that summarizes the contaminants when they exceed either a Federal or State screening level (MCL; SCTL) for each media. I am basically asking for the information presented in the Conclusions, Section 9.1, except in a form that is easily understood and used in evaluating the report and which includes only information where a regulatory level is exceeded. In that regard, I am attaching a suggested form for the table.

   Response: A summary table providing a list of contaminants exceeding screening criteria will be included in the final report.

5. Does the Navy intend to incorporate the background evaluation that is currently being formulated into Section 6.2, where the various soil types are discussed and which were evaluated in the General Information Report? It seems that it may be appropriate to wait on the conclusion of the ongoing background evaluation.

   Response: The background evaluation will be submitted as a separate report. For the purpose of the Site

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RI, information presented in the GIR will be used.

6. Be aware that Chapter 62-777, F.A.C. is currently being promulgated by the Department and could be adopted by late this Spring. When it is, all media contaminant values will be represented by the values in that rule. If the final remedy for Site 16 is not in place before that time, we will have to review the values, where different and determine if they affect any conclusions and recommendations that have been made.

   Response: A comparison to Chapter 62-777, F.A.C will be included in the report.

7. Figures 6-2 through 6-13: several figures in this group have the risk lines in the wrong place and several give the FDEP Risk Level as a range. Please refer to Figure 6-10, which is correct. Please make the remaining figures the same as it for the risk level and for placement of the heavy line. Please add a "1" at the level of the heavy line on the ordinate of Figure 13.

   Response: All figures in Chapter 6 will be reviewed for errors. FDEP risk level will be clearly identified instead of a range.

8. Table 6-12, page 6-47: please make sure the leaching values in the eleventh column are those from Chapter 62-785, F.A.C. or Chapter 62-777, F.A.C., depending on when the final document is submitted.

   Response: Table 6-12 will be updated per values presented in Chapter 62-777.

9. Section 6.8, Summary of Human Health Risk Assessment: the sixth "bullet" discusses the background values of arsenic. Unless those data are presented and discussed in the report, that statement should not be a part of the summary and should be deleted. Additionally, I find it disturbing that the Navy only discusses the presence of PAHs in the context of "other non-site related anthropogenic sources." It would be interesting if the Navy would elaborate on and discuss some of those other sources. The Navy should recognize that, in the absence of a valid reason to believe otherwise, it is likely that waste disposal practices are responsible for the presence of these materials at Site 16, especially since the name of the site is given as an "open disposal and burning area." This is an example of a continuing pattern of downplaying the importance of analytical information. This is reinforced by the statement in the same section regarding beryllium in surface water and the accompanying discussion that apparently is intended to cast doubt on the data in which it states "that this ELCR is based on only one sample." I suggest that that Navy should take additional samples instead of denigrating data that it has collected at great cost and which should be valid.

   Response: The arsenic statement in Section 6.8 will be removed. All data collected at Site 16 will be reevaluated before the RI is finalized to ensure appropriate conclusions have been made.

10. Section 7.4.1, page 7-20, Section 7.4.4, page 7-27, Section 7.6.4, page 7-35 and Section 9.1, page 9-5: the use of a 10-fold attenuation factor to evaluate risks to aquatic receptors is not entirely valid. The Navy should also present an evaluation of undiluted ground water to aquatic receptors as a realistic "worst case" scenario. This should not come as a surprise, since the State of Florida has been consistent in not allowing dilution factors to be a part of ground water evaluations.

    Response: The undiluted groundwater at Site 16 will be evaluted as a worse case exposure scenario for aquatic receptors. The results of this evaluation will be incorporated into the existing text. In addition, an ERA is going to be conducted for Clear Creek, focusing on surface water and sediment collected from the creek.

11. Section 7.6.4, page 7-38, last paragraph: the discussion regarding salmonid fish species is questionable in that no data are presented to show that they "do not occur in Clear Creek downstream of Site 16." It could be postulated, using Navy data, that they do not occur downstream of Site 16 *because* of the discharge of high iron content ground water. Irrespective, the point is that if the discharge is high in iron, it is, *ipso facto*, something which should be addressed on a rational basis by the Navy.

    Response: Additional data will be collected to address the reviewers comment during the investigation of Clear Creek and its tributaries as a separate site (Site 39).

12. References: please update the FDEP references to reflect the newer and current regulations and guidance documents.

    Response: References will be updated as recommended.

General Comment:

1. Although these comments are few in numbers, they will necessitate considerable rewrite of the document and changes in many of the tables. In effect, a new report will be produced. I request that the Navy incorporate the changes with respect to the Florida-based content prior to submitting any future reports since they cannot be adequately reviewed in the absence of the newer information.

    Response: Future reports will include evaluations based on the latest guidance.

Response to Review Comments
Remedial Investigation Report
Site 16, Open disposal and Burning Area
NAS Whiting Field, Milton, Florida

USEPA SPECIFIC COMMENTS:

1. **Page IV, Second Bulleted Item**. Please note that the memo accompanying the EPA Region III Risk-Based Concentration (RBC) table from Roy L. Smith, toxicologist, clearly states that generally the RBC table should not be used to set cleanup levels. As such, the RBCs should not be referred to as residential soil cleanup goals.

   Response: As suggested by the reviewer, RBCs will not be referred to as residential soil cleanup goals.

2. **Page xvi, Glossary**. The definition for **IRIS** in the glossary is unreadable. Please revise in subsequent versions of the report.

   Response: Page xvi will be revised.

3. **Page 3-6, Table 3-1 and Appendix C**. Table 3-1 presents a Summary of Monitoring Well Construction Details and Appendix C contains individual monitoring well and test pit logs. However, many of the well logs listed in Table 3-1 are not presented in Appendix C. Also, monitoring well logs WHF-16-2D and WHF-16-6I are presented in Appendix C, but are not listed in Table 3-1. Additionally, several monitoring well logs (WHF-15-3I, 15-3D, 15-4S, 15-5S, WHF-16-3II) in Appendix C are missing pages and monitoring well logs WHF-15-15-4S, WHF-15-5S and WHF-1466-6S appear to be mislabeled. These discrepancies should be corrected in the RI Report.

   Response: Discrepancies identified by the reviewer will be corrected. However, a monitoring well was not installed at soil boring location WHF-16-2D. Therefore it was not included in Table 3-1.

4. **Page 5-6, Section 5.2, Hydraulic Conductivity and Seepage Velocity**. The text states, "The average hydraulic conductivity values for individual monitoring wells at Site 16 ranged from 0.27 feet per day (ft/day) (9.5×10^{-2} centimeters per second [cm/sec]) for WHF-16-3D to 46.5 ft/day (1.64×10^{-5} cm/sec) for WHF-16-3II. The geometric mean of the hydraulic conductivity values for Site 16 is 22.2 ft/day (7.8×10^{-4} cm/sec) or approximately 8,000 feet per year." However, the centimeters per second values appear to have been incorrectly converted from the values in feet per day. The values 0.27 ft/day should be $9.5\ 10^{-5}$ cm/sec, 46.5 ft/day should be $1.64\ 10^{-2}$ cm/sec and 22.2 ft/day should be $7.8\ 10^{-3}$ cm/sec. The calculations should be verified and corrected in the text if necessary.

   Response: Calculations will be verified and corrected.

5. **Page 5-11, Table 5-2**. As indicated on Table 5-2, the distance between monitoring wells WHF-16-2S and WHF-16-4S and between wells WHF-16-6S and WHF-16-3S are 900 feet and 495 feet, respectively. However, according to the scale presented on Figures 5-5 and 5-6, the distances are 930 and 540 feet, respectively. This amount of difference in the distances between wells would change the hydraulic gradient calculations; therefore the correct well distances should be used in calculating the hydraulic gradients and should be corrected in the text as well as the table.

   Response: Discrepancies between the figure and the table will be corrected. If necessary, the hydraulic gradients will be revised.

6. **Page 5-15, Section 5.3**. The text states that a mounded feature was associated with a *significant* total magnetic anomaly and a conductivity anomaly. However the text does not elaborate further as to the nature of the anomalies. Has the potential existence of buried drums been investigated? The text also states, "An attempt was made to determine the depth of the fill at Site 16 using DC resistivity. Results

were inconclusive, however, and the survey was not completed (ABB-ES, 1993)." The text should provide additional information stating why the results were inconclusive and why the survey was not completed.

Response: The text will be revised to read as follows.

A mounded feature located at grid coordinates 680E, 190S (Figure B-1, Appendix B of this report) was associated with a high amplitude magnetic anomaly and a conductivity anomaly. This suggests a pit may have been dug at this location and filled with ferromagnetic metal subsequently covered. The survey grid was extended to the east in an attempt to extend past all the anomalies. But after three attempts, it was discontinued because these isolated anomalies appeared to be not associated with the Open Disposal activities at Site 16.

The potential for the existence of buried drums at this location was not investigated further.

7. **Page 5-23, Figure 5-9**. Figure 5-9 presents interpreted total volatile organic compounds (VOC) isopleth lines. Soil gas sample location numbers 35 and 45 are, according Figure 5-9, near the total VOC concentration line which indicates greater than 5000 parts per million (ppm). If soil gas sample locations 35 and 45 have concentrations greater than 5000 ppm, the actual concentrations at these locations should be stated in the text of the RI Report.

   Response: The actual concentrations for soil gas location numbers 35 and 45 are >5,000 and >5,000 respectively. The instrument has a range of 0 to 5,000 ppm and therefore the concentrations are presented as >5,000 ppm.

8. **Page 5-40, Section 5.5**. When comparing site related data to the EPA Region III RBCs, the text should clearly state whether industrial or residential values were exceeded. This comment also applies to other locations within the report where data is screened against the RBCs.

   Response: As suggested by the reviewer, the text will clarify if residential or industrial values are exceeded.

9. **Page 5-43, Table 5-12**. The semi-volatile constituent presented in Table 5-12, as methylnaphthalene should be corrected to be 2-methylnaphthalene.

   Response: The text will be revised as recommended by the reviewer.

10. **Page 5-49, Section 5.7**. The text should clearly state the intent behind comparing site-related data for surface water to the Florida Groundwater Guidance Concentrations.

    Response: Rationale for comparing the surface water to the Florida GCTLs will be included in this section.

11. **Page 5-60, Section 5.8.2**. In the last paragraph on this page, the text should state that aluminum exceeded the Federal and State **secondary** MCL in two monitoring wells. The comment applies elsewhere in the report where aluminum exceedances in groundwater are being reported.

    Response: The text will be revised as recommended by the reviewer.

12. **Page 5-72, Table 5-24**. Several of the Federal Maximum Contaminant Levels (MCLs) and Florida Guidance concentrations for the associated constituents appear to be incorrect. For example, the Federal MCL and Florida groundwater guidance for 1,2-dichloroethene (total) should both be 70 micrograms per

liter (µg/l). However, Table 5-24 lists these concentrations as 55 µg/l and 7 µg/l respectively. These guidance numbers should be checked and verified prior to performing the feasibility study.

Response: Table 5-24 will be revised and values from Chapter 62-777 FAC will be incorporated.

13. **Page 5-76, Section 5.8.2**. According to the EPA Region 4, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, May 1996, as a standard practice, ground water samples will not be filtered for routine analysis. Filtering will usually only be performed to determine the fraction of major ions and trace metals passing the filter and used for flow system analysis and for the purpose of geochemical speciation modeling. Filtration is not allowed to correct for improperly designed or constructed monitoring wells, inappropriate sampling methods, or poor sampling technique. When samples are collected for routine analyses and are filtered, such as under conditions of excessive turbidity, both filtered and non-filtered samples will be submitted for analyses. With this in mind, this section of the report should address the findings of the non-filtered sample analysis followed by a discussion of the filtered samples. The text should also address discrepancies between non-filtered versus filtered samples.

    Response: The text will a discussion of filtered and unfiltered analytical results and identify any discrepancies between filtered and unfiltered samples.

14. **Page 5-78, Section 5.8.2**. Please verify the federal MCL for 1,2-dichloroethene as reported in the third paragraph.

    Response: MCL for 1,2-dichloroethene will be verified.

15. **Appendix C, Monitoring Well and Test Pit Logs**. The boring log for monitoring well WHF-15-71 lists "OVA" under the column for drilling method. OVA is incorrect, the correct drilling method should be either mud rotary, hollow stem auger or other drilling method as appropriate. The boring log should be corrected to reflect the proper drilling method. Also, several well logs have the well development date omitted. This information should be added to the well logs that do not have this information. The test pit lithologic description logs do not have the name of the individual who logged the excavation. This information should be included on the test pit logs.

    Response: All available information will be included in the boring logs.

16. **Appendix E, Surface Water Analytical Data**. A duplicate set of groundwater analytical data, presented as Appendix G was included in Appendix E, Surface Water Analytical Data. This duplicate data set should be removed from the RI.

    Response: The duplicate data set will be deleted.

** The following comments relate to the human health and ecological risk review sections of the Site 16 RI Report:

GENERAL COMMENTS:

17. Section 6.4 of the report presents the human health toxicity assessment for Site 16. The text states that Appendix G contains brief toxicity summaries for human health contaminants of potential concern (COPCs) identified in surface soil, subsurface soil, surface water, and groundwater at the site. However, Appendix G does not presently contain this information. In addition, toxicity profiles are not included in the ecological risk assessment (ERA) for compounds that are present at concentrations greater than their ecological screening value. This information should be included as part of the ecological toxicity

evaluation. In order to evaluate the toxic potential of the contaminants identified in the media at this site, toxicological information should be presented for each of the contaminants identified as human health and ecological chemicals of concern.

Response: Missing information identified in the comment will be included in the final RI report.

18. The step-wise procedure that is used to identify Contaminants of Concern (COCs) at Site 16 (illustrated in Figure 7-3, Page 7-10) does not follow the step-wise procedure delineated in *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessment* ("Process Document", 1997). EPA Region IV has stated that all ERAs that have not been finalized must follow the procedures described in the Process Document, which supersedes all prior guidance. The most significant difference between the procedures used in this ERA and the Process Document is that in this ERA, compounds are compared to frequency, background levels, and role as essential nutrients before being compared to ecological screening levels. The initial step identified by the Process Document is the comparison of compound concentrations to ecological screening levels, so that the potential for risk is determined before mitigating factors are considered. Refer to the Process Document and the December 1998 Region IV memorandum for additional guidance on revising the ERA.

Response: The Site 16 ERA will be reviewed to determine whether the conclusions presented in this report would be altered by using the most recent *Process Document* approach. If it is determined the qualitative conclusions of the ERA would have been affected, additional information will be included in the final RI report.

19. The method that is used to quantify risk in this ERA is not in accordance with current EPA and Region IV guidance. Food chain modeling based solely on soil concentrations, which is the approach used in this ERA, is strongly discouraged in the new guidance. Instead, the actual exposure of primary consumers (such as the mouse, shrew, and meadowlark) to compounds that are present in environmental media at concentrations greater than their ecological screening and background values is to be determined by sampling and analysis of earthworms/insects and plants at the site. This approach reduces much of the uncertainty associated with former procedures, including the issues of bioavailability and soil-to-organism transfer rates. Since it appears that all of the samples from this site were collected prior to the release of the new guidance (1996 and earlier), the lack of biological samples to support the ERA is understood. However, it is strongly recommended that the procedures for conducting ERAs at other Whiting Field sites be revised so that they are in closer agreement with the Process Document and the most recent Region IV guidance.

Response: The reviewers comment is noted and the Navy will follow the procedures provided in the *Process Document* and Region IV guidance for future ERAs conducted at Whiting Field.

20. The Dutch soil screening levels that are used as ecological screening values for Site 16 [Beyer. 1990. Evaluating soil contamination. US Fish and Wildlife Service, Biological Report 90(2)] may not be sufficiently protective of ecological receptors. Region IV issued ecological screening levels for soil in December 1998 and has stated that screening levels used in ERAs that have not been finalized should be comparable to the values that have been adopted. When the two sets of screening values were compared, it was determined that the screening values used for arsenic and chromium in this ERA are much higher than those adopted by Region IV. The recommended screening value for arsenic is 10 mg/kg rather than 20 mg/kg and for chromium is 0.4 mg/kg rather than 100 mg/kg. If the Region IV values had been used in this ERA, neither compound would have been screened out and the risks both compounds would have been calculated. Potential risks from arsenic and chromium must be addressed in the ERA.

Response: The new Region IV ecological screening values will be incorporated into the Site 16 ERA and the results will be revised accordingly.

21. An assessment of risks from subsurface soil (below a depth of 1 foot) to ecological receptors is not included in the ERA. Although it is unlikely that birds and mammals will have consequential contact with subsurface soil, the root zone of many shrubs and trees such as pine trees will include subsurface soil. Also, soil invertebrates such as earthworms and fire ants can be expected to burrow into deeper than 1 foot into the subsurface soil. A qualitative assessment of risks in subsurface soil to these receptor groups should be included in the ERA.

    Response: An assessment of the analytes detected in subsurface soil will be conducted and the potential for risks to deep rooted trees and soil invertebrates will be evaluated. This information will be included in the revised report.

22. Hazard Quotients (HQs) for contaminants at Site 16 are calculated using the 95% Upper Confidence Limit (UCL) rather than the maximum site concentration. Region IV has stated that 95% UCLs should not be used in ERA. Rather, to show the potential risk at the site, HQs should be determined using the following combinations: maximum site concentration/NOAEL, average site concentration/NOAEL, maximum site concentration/LOAEL, and average site concentration/LOAEL. For Site 16, the perceived maximum risks are, in general, increased less than four-fold if the maximum concentration is used rather than the 95% UCL. The Hazard Indices for most receptors remain less than 1. No changes are requested in the Site 16 ERA regarding to the use of the 95% UCL, but future submissions should not use the 95% UCL to calculate risk.

    Response: All future ecological exposure assessments will use average and maximum concentrations terms.

SPECIFIC COMMENTS:

23. **Table 6-3**. The table presents the selection of human health chemicals of potential concern. An asterisk is presented in the table in the "Detected Concentrations Range" column of the table. However, the endnotes on this table do not provide any information regarding the intended meaning of this notation. The endnotes should indicate the definition of the asterisk.

    Response: Table 6-3 will be revised as suggested by the reviewer.

24. **Page 7-1, Section 7.0, Paragraph 1**. Six documents are described as current guidance for ERAs at Superfund sites. However, the Process Document (*Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessment*, 1997) supercedes the 1989, 1992, and 1996 guidance documents, and EPA has stated these older documents should not be used in the preparation of risk assessments. Region IV Supplemental Guidance has been superceded by the December 1998 memorandum; this memorandum may not have been available at the time this ERA was prepared. Since food chain modeling is not included in the Process Document, it will be necessary to cite some of the older documents in the text. In order to bridge the old and new guidance, the text should be revised so that it is clear that the older documents do not represent current guidance and stating why the superceded guidance documents are being used in this ERA.

    Response: The text will be revised to clarify which documents represent current guidance and why superceded documents were used in the ERA.

25. **Page 7-5 through 7-7, Section 7.2.2; and Page 7-6, Figure 7-2**. The Conceptual Site Model (CSM) presented in the ERA is too general. Four broad groups of ecological receptors are identified–wildlife, terrestrial plants, terrestrial invertebrates, and aquatic receptors. As per guidance in the Process Document, the CSM should distinguish between exposure routes for different groups of wildlife receptors such as herbivorous birds and mammals, primary carnivores/omnivores, and secondary carnivores. A CSM should illustrate the food web and the relationship between the specific receptors that are being modeled. The CSM for Site 16 should be revised, or a second Figure illustrating the food web relationship between different receptors should be added to the ERA.

    Response: A more detailed conceptual site model will be generated included in the final RI report.

26. **Page 7-6, Figure 7-2**. The meaning of the bullets that appear in various receptor/exposure route boxes is not provided in either the figure or the text. It cannot be assumed that the reader will know that the bulleted boxes indicate complete exposure pathways. This information should be added to the figure.

    Response: Footnotes will be added to this figure to clarify the meaning of the bullets and shading.

27. **Page 7-7, Section 7.2.2, Paragraph 1**. The text states that dermal adsorption is considered a negligible exposure pathway. This statement is generally qualified, since dermal adsorption can present a significant risk in areas that are heavily contaminated with particular compounds. The text should be modified to read that dermal adsorption is considered to be a negligible exposure pathway for receptors at this site relative to ingestion because the presence of fur and feathers is likely to prevent extensive direct contact with the skin. Also, the exclusion of the dermal adsorption and inhalation pathways from the ERA should be included as a source of uncertainty in the Uncertainty Analysis (Section 7.7).

    Response: The text will be modified to read, dermal adsorption is considered to be a negligible exposure pathway for ecological receptors based on the presence of fur and feathers and the likelihood they would prevent direct contact to the skin. An uncertainty will be added to Section 7.7 to further discuss the type and magnitude of ECPCs detected at the site, and the likelihood they are not present at concentrations high enough to generate a dermal or inhalation risks.

28. **Page 7-7, Section 7.2.2, Paragraph 2**. The text states that no burrowing animals were observed as Site 16 during characterization. This does not mean that burrowing animals will not inhabit Site 16 in the future, since the area appears to be desirable to ecological receptors. The text should be modified to state that although no burrowing animals were seen at Site 16, the site does provide acceptable habitat for burrowing animals.

    Response: The last sentence of the second paragraph on page 7-7 will be modified to include a statement regarding the suitability of Site 16 for burrowing animals. "...although this habitat may be suitable to these receptors."

29. **Page 7-9 through 7-20, Section 7.3, Figure 7-3**. The selection process for ecological COCs has been changed in the Process Document. The most significant change is that the soil sampling data should first be screened against ecological screening levels. Only after screening are compounds present at concentrations greater than their ecological screening levels evaluated regarding frequency of detection, background levels, and role as essential nutrients. The selection process in this ERA for Site 13 should be revised to be in agreement with the new guidance.

    Response: Please refer to USEPA Comment # 18.

30. Page 7-11, Section 7.3, Paragraph 3, and Table 7-2. The Dutch soil screening values from Beyer that were used, as ecological screening values for Site 16 are out-of-date. Region IV has recently adopted soil screening values based on more recent screening values developed by the Netherlands, the Canadian Council of Ministers of the Environment, and Oak Ridge National Laboratory. The recommended screening value for arsenic is 10 mg/kg rather than 20 mg/kg and for chromium is 0.4 mg/kg rather than 100 mg/kg. Screening values for iron and silver have adopted. The ERA should acknowledge the new guidance and include some discussion as to whether the use of the newly adopted values would have altered the conclusions presented in the ERA.

    Response: The new Region IV ecological screening values will be incorporated into the Site 16 ERA and the results will be revised accordingly.

31. Page 7-13, Table 7-2. The 95% UCL for aluminum is 11,271 mg/kg. This number is difficult to read since the first "1" is printed on the column line. The table should be revised so that the number is clearly printed.

    Response: Table 7-2 will be revised as suggested by the reviewer.

32. Page 7-20, Section 7.4.1, Paragraph 7. The text states that a 10-fold attenuation factor was applied to the RME concentration of constituents in groundwater in order to derive an exposure concentration for constituents in groundwater potentially reaching Clear Creek. No justification was provided in the ERA for the selection of 10 as the attenuation factor. The rationale for selecting this attenuation factor should be included in the ERA.

    Response: The 10-fold attenuation factor is a conservative estimate of the attenuation occurring between groundwater and surface water exposure.

33. Page 7-21, Section 7.4.2 and Page 7-25, Table 7-7. The calculated risks to avian primary consumers are based solely on the Eastern Meadowlark, which consumes approximately 75% of its diet as invertebrates and 20% as plant materials. Because of differences in biouptake and bioaccumulation, the concentrations of contaminants in invertebrates and plants are generally disproportionate. The percentage of invertebrates and plants in the diet will alter the calculated risks to the receptor. This dietary difference is addressed for small mammals with the inclusion of both herbivorous and insectivorous primary consumers. In lieu of the inclusion of a herbivorous avian receptor, it is recommended that differences in diet be identified and discussed as a source of uncertainty in the ERA.

    Response: A discussion of the differences in the diet of herbivorous and insectivorous birds and the ramifications on the calculated risks for avian receptors will be provided in Section 7.4.2.

34. Pages 7-35 through 7-39, Section 7.6.4. Much of the discussion of risks from groundwater discharging to Clear Creek is inappropriate in the context of a risk assessment. Five compounds, bis(2-ethylhexyl)phthalate, 4,4'-DDT, aluminum, iron, and zinc are theoretically present in the groundwater at concentrations higher than screening criteria. It must therefore be assumed that there is a potential for risk. However, within the context of the risk assessment, these compounds are excluded as COCs for a variety of reasons, including frequency of detection, background concentrations, the presence of suspended solids in groundwater samples, and toxicity to resident species. These reasons are more properly part of the risk management process, and their discussion should be separate from the risk assessment. It is the responsibility of the risk manager and the trustees of the site working with the risk assessor to the significance of this information. The text should be revised so that the risk assessment and risk

management discussions are separate and clearly identified.

Response: As suggested by the reviewer, for all future reports the consideration of the frequency of detection, background concentrations, use of unfiltered data, and relative toxicity will be included in a separate section.

35. **Page 7-36, Table 7-12**. A value of 50 ug/L is cited as the AQUIRE Lowest Reported Adverse Effect concentration. The value is for the narrow mouth frog. However, based on the AQUIRE values presented in Appendix I, the lowest reported adverse effect concentration is 15 ug/L for brown trout. The text (Page 7-38) correctly identifies 15 ug/L as the lowest value. The table entry should be corrected.

Response: The value of 50 ug/L, for the narrow mouth frog was used in Table 7-12, as this species is more likely to be present in a black water stream than a salmonid species (i.e., brown trout). The narrow mouth frog is more representative of the aquatic receptors present at the site. Changing this value to 15 ug/l does would not have an affect on the outcome of the risk assessment. Please refer to response to general comment #11.

36. **Page 7-38, Section 7.6.4, Paragraph**. The text states that aquatic receptors in Clear Creek downgradient of Site 16 are likely to be more tolerant of aluminum than larval trout. No evidence is presented to corroborate the validity of this statement. Additional discussion including the identification of species present in Clear Creek (or alternatively a reference to where the species list is located) and relevant toxicity data must be included to the text to support the statement that aluminum is less toxic to receptors in Clear Creek than indicated by the lowest AQUIRE value.

Response: The text states, the receptors likely to be present in the stream, are more tolerant to exposure to aluminum, than larval trout. Please refer to comment #35. In addition, text will be included in this section to support the statement; receptors down gradient from the site are more tolerant to exposure to aluminum.

37. **Page 7-39, Section 7.7, Paragraph 6**. The text states that risks to amphibians and reptiles species from the surface soil were not estimated because bioaccumulation and toxicity data are lacking. Since quantitative exposure data are not available, a brief qualitative discussion as to whether risks to these groups are anticipated should be included in the Uncertainty Analysis. The qualitative discussion might include information such as the general toxicity of the compounds present (i.e., are any known to be unusually toxic to these receptor groups in other media), their probable bioavailability, and whether the amphibian and reptile populations at this site show signs of stress.

Response: As recommended by the reviewer, a discussion of the risks to amphibian and reptile species will be added to the uncertainty section.

38. **Page 7-41, Section 7.8, Paragraph 3**. The text states that risks to aquatic receptors in Clear Creek are not expected, based on the screening evaluation of groundwater. This is not correct; refer to Specific Comment 9. Five compounds, bis(2-ethylhexyl)phthalate, 4,4'-DDT, aluminum, iron, and zinc are theoretically present in the groundwater discharging into Clear Creek at concentrations higher than screening criteria. Their exclusion as COCs is based on a weight-of-evidence risk management discussion. In the ERA, these five compounds should be identified as having a potential to cause risk.

Response: The text will be revised to state, the analytes listed in the comment were detected at concentrations exceeding ecological screening benchmarks. However, it is unlikely, these analytes would pose a risk to ecological receptors based on the arguments presented in Section 7.6.4. In addition, please refer to comment #11.

39. **Page 9-5, Section 9.1, Paragraph 3; and Page viii, Executive Summary, Paragraph 2**. The text states that risks were not identified for terrestrial wildlife resulting from exposure to compounds in surface soil or surface water, and that therefore reductions in the survivability, growth and reproduction of wildlife populations is not anticipated. This is incorrect. Sublethal risks associated primarily with cadmium, lead, and zinc in the surface soil were identified for small mammals, small birds, and predatory birds. Sublethal risks include reductions in growth and reproduction. This is correctly stated in Paragraph 7 on Page 9-5 and Paragraph 6 on Page viii. The text should be corrected.

    Response: The text will be revised.

40. **Page 9-5, Section 9.1, Paragraph 6; and Page viii, Executive Summary, Paragraph 5**. The text states that risks to aquatic receptors in Clear Creek are not expected based on the screening evaluation of groundwater. This is not correct; refer to Specific Comment 9. Five compounds, bis(2-ethylhexyl)phthalate, 4,4'-DDT, aluminum, iron, and zinc are theoretically present in the groundwater discharging into Clear Creek at concentrations higher than screening criteria. The text should be corrected.

    Response: Please refer to comment #38.

41. **Appendix H**. Spreadsheets showing the intermediate steps in the calculation of Potential Dietary Exposure (PDE) are not included. Data such as the calculated dietary exposure from each food item should be included.

    Response: The spreadsheets will be reviewed and any missing tables will be included in the updated report.

42. **Appendix H, Table H-6**. For the Great-Horned Owl, a dietary exposure of 9% sediment is identified. This value causes the dietary percentages for the owl to total 108%. In Table 7-7 (Page 7-25), there is no mention of the ingestion of sediment by the owl, and the incidental ingestion of soil is reported to comprise 1% of the diet. There is no reference for the source of the sediment ingestion rate. The apparent discrepancy between Table H-6 and Table 7-7 should be resolved.

    Response: Please refer to comment #41.

APPENDIX K

EVALUATION OF BACKGROUND CONCENTRATIONS FOR COVERED LANDFILL SITES

Evaluation of Background Arsenic Concentrations for Covered Landfill Sites

Naval Air Station (NAS) Whiting Field, Milton, Florida

At NAS Whiting Field nine soil types, as identified by the U. S. Department of Agriculture, Soil Conservation Service (USSCS), are present. The Remedial Investigation (RI) sites at NAS Whiting Field are associated with seven of the nine soil types. The background surface soil data set for each RI site was initially determined to be comprised of background surface soil samples from the same USSCS soil types as occur on the individual sites. However, available information and review of historical aerial photographs indicated that in the construction of landfills at the facility, a borrow pit was dug to an approximate depth of 10 to 15 feet below land surface (bls) and the excavated soil was piled to the side. Following landfill operations, the borrow materials comprised of undifferentiated surface and subsurface soils, were used for the landfill cover. Any additional soils required to complete the landfill cover are believed to have been obtained from other borrow pits located at the facility.

If a mix of surface and subsurface soils were used in the cover for landfills, it would be appropriate to use the combined data set of surface and subsurface soil samples as the background screening value. However in order to be protective of human health and the environment, it is proposed that the background surface and subsurface data set be combined to a single value as be used as the "Industrial Use Soil Cleanup Goal". This modified "Industrial Use Soil Cleanup Goal" is specifically limited to the covered landfill sites including: Site 1, 2, 9, 10, 11, 13, 14, 15, and 16 and to the inorganic analyte arsenic.

Tables 3-8 through 3-18 in the General Information Report present the detected concentrations and summarize the analytical data for the individual background soil samples collected at NAS Whiting Field. A summary of the arsenic background data set and the modified "Industrial Use Soil Cleanup Goal" for arsenic is presented Table I-1. As indicated on the table the modified "Industrial Use Soil Cleanup Goal" for arsenic to be used at covered landfill sites is 4.62 mg/kg.

Table A-1
Summary of Arsenic Detected in Surface and Subsurface Background Soil Samples

Feasibility Study
Site 12, Tetraethyl Lead Disposal Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection Surface Soil Samples[1]	Mean of Detected Concentrations Surface Soil Samples[2]	Frequency of Detection Sub-surface Soil Samples[1]	Mean of Detected Concentrations Subsurface Soil Samples[2]	Frequency of Detection Surface and Subsurface Soil Samples[1]	Mean of Detected Concentrations Surface and Subsurface Soil Samples[2]	Surface and Subsurface Soil Background Screening Concentration (modified Industrial Use Cleanup Goal)
Inorganic Analytes (mg/kg)							
Arsenic	15/15	1.54	14/14	3.14	29/29	2.31	4.62

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed.
[2] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples in which the analyte was not detected.

Note: mg/kg = milligrams per kilogram.

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Table A-2
Comparison of Detected Arsenic Concentrations in Surface and Subsurface Soil Samples to Florida Soil Cleanup Goals

Feasibility Study
Site 12, Tetraethyl Lead Disposal Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Minimum Detected Concentration	Maximum Detected Concentration	Mean of Detected Concentrations	Soil Cleanup Target Levels for Florida (Residential)[1]	Soil Cleanup Target Levels for Florida (Industrial)[1]	Surface and Subsurface Soil Background Screening Concentration (modified Industrial Use Cleanup Goal)[2]
<u>Inorganic Analyte</u> (mg/kg)						
Arsenic	0.52	6.3	2.31	0.8	3.7	4.62

[1] Source: Chapter 62-785, Florida Administrative Code.
[2] The modified Industrial Use Cleanup Goal for arsenic is the Florida Department of Environmental Protection approved site specific cleanup gaol for Perimeter Road sites at Naval Air Station, Whiting Field.

Note: mg/kg = milligrams per kilogram.

DRAFT

Department of Environmental Protection

Lawton Chiles
Governor

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Virginia B. Wetherell
Secretary

April 27, 1998

Ms. Linda Martin
Department of the Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive, PO Box 190010
North Charleston, SC 29419-9010

file: arsenic1.doc

RE: Request for Site-Specific Arsenic Soil Cleanup Levels: Covered Landfill Sites, NAS Whiting Field

Dear Ms. Martin:

I have reviewed the request for approval of a site-specific Soil Cleanup Goal for arsenic at the "covered landfill sites" at NAS Whiting Field from Mr. Gerald Walker, ABB Environmental Services, dated April 22, 1998 (received April 22, 1998). Based on the prior presentation to Department Staff and the summary information furnished in the letter and the attached Appendix I, the request is granted to utilize a site-specific Soil Cleanup Goal for arsenic of 4.62 mg/kg at Sites 1, 2, 9, 10, 11, 12, 13, 14, 15 and 16., with the following conditions:

1. The sites may be utilized for activities that involve less than full-time contact with the site. This may include, but is not limited to, a.) parks b.) recreation areas that receive heavy use (such as soccer or baseball fields) or, c.) agricultural sites where farming practices result in moderate site contact (approximately 100 days/year, or less).

2. The Navy must assure adherence to the land use by incorporating the site and conditions in a legally binding Land Use Contol agreement.

3. The above Soil Cleanup Goal shall not be utilized at any other site without specific Department approval.

If you have questions or require further clarification, please contact me at (904) 921-4230.

Sincerely,

James H. Cason, P.G.
Remedial Project Manager

"Protect, Conserve and Manage Florida's Environment and Natural Resources"